The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XX. No. 498 JANUARY 12, 1929 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.5.0.

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices: Bouverie House, 154, Fleet Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

The British Industries Fair

THE British Industries Fair has now become an annual event of the greatest importance to traders at home and abroad, and every year the Fair grows in magnitude and interest. The chemical section will be housed at the White City, Shepherd's Bush, London, in Hall K, where it was last year. Some 15,000 sq. ft. are occupied by the chemical exhibits, which are of a more comprehensive and diversified nature than they have ever been. All classes of chemicals are represented by the exhibitors participating.

The organisation of the chemical section has, as usual, been in the hands of the Association of British Chemical Manufacturers. The Association will have an office in Hall K, from which would-be buyers or anyone interested in the chemical industry will be able to obtain information on any subject connected with the chemical section or the manufacture of chemicals. Copies of the new directory, which has just been issued by the Association, will be available gratis to all *bona fide* purchasers.

This year there will be no collective exhibit by the British Chemical Plant Manufacturers' Association, as the policy of this Association is to exhibit only every other year, but there will be a Plant Association Office at which meetings may be arranged, and from which catalogues and trade literature of the members will be supplied to all interested in British chemical plant. The new directory shows in detail the products manufactured by the various members of the Association, and will be available for issue free of charge to all interested in British chemical plant.

Fuel Investigations

LAST September the National Fuel and Power Committee suggested in its report that the system of networks of gas mains, fed from various sources and operating over large areas, which has been developed on the Continent, was deserving of investigation with a view to its application in this country.

Committees and Commissions appointed by the Government sometimes have the galling experience of seeing their arduous work wasted, but in the present instance it is clear that the recommendations are receiving proper attention. At the banquet given in connection with the World Power Conference (Fuel Conference), just at the time when the Fuel and Power Committee's report appeared, Sir Philip Cunliffe-Lister, President of the Board of Trade, announced that the suggestion to which attention has been drawn above was to be the object of an inquiry. It is now officially announced that the Board of Trade have appointed a committee consisting of Sir Alexander Walker (chairman), Mr. T. Hardie, Dr. C. H. Lander, Mr. W. A. Lee, Mr. M. Mannaberg, Sir R. A. Pease, and Mr. S. Tagg, to undertake an investigation as recommended by the National Fuel and Power Committee in its report of September, 1928, in relation to a limited area, such as that between the Humber and Liverpool and between Leeds and Birmingham, respecting the technical and economic aspects of an area gas supply system, comprising an inter-connecting network of pipe lines fed by a number of gas works, coke ovens, and the like. Mr. R. J. Moffat is the secretary and Mr. D. Haigh the assistant secretary of the committee, and communications should be addressed to the Secretary, Area Gas Supply Committee, Board of Trade, Great George Street, London, S.W.1.

A further announcement of great interest in the fuel field also comes to hand this week. The installation of a low temperature carbonisation plant at Richmond by the Gas Light and Coke Co., in conjunction with the Fuel Research Board, is now almost completed, and by the end of this month a new smokeless fuel will be put on the market. The installation is experimental in character, the object being to determine whether smokeless fuel for use in open grates, in substitution of coal, can be produced on an economic basis. It may be recalled that about two years ago the Gas Light and Coke Co. was asked by the Government to try out the process of low temperature

carbonisation which appeared to it the most promising for working in connection with a London gasworks. The company selected the process developed at the Fuel Research Station at Greenwich, and the plant has been installed at the company's works at Richmond. The conditions ensure a thorough trial for two or three years, and the knowledge and experience gained will be at the disposal of all interested.

The new fuel, which will be known as "Fuelite," is expected to prove more economical than good class house coal. Arrangements have been made to produce 150 tons a day. The first supplies will be available for delivery towards the end of the month. The price of the fuel will be relatively high compared with that of coke, namely, 48s. per ton. It is claimed for "Fuelite" that it ignites easily, is smokeless, and gives a radiant glow.

The Nitrate Sales Scheme

IT is reported that conversations have been taking place between the producers of Chilean nitrate who are parties to the centralised sales scheme and the Anglo-Chilean Consolidated Nitrate Corporation (Guggenheims). It will be remembered that when the Chilean Government organised its scheme for centralised selling, the Anglo-Chilean Consolidated Nitrate Corporation and the Grace Nitrate Co. (who together produce about 15¾ per cent. of the total output) were both, owing to the operation of the American anti-trust laws, prevented from participating. It is thought that the conversations now reported have as their object the devising of some means whereby the Anglo-Chilean Consolidated Nitrate Corporation can join in the centralised sales scheme. It seems, also, that any action taken would probably affect the Grace Nitrate Co. In such a case, the sales scheme would be strengthened by the fact that it dealt with 100 per cent. of the Chilean nitrate production.

As we go to press (after the above had been written), it is announced by Aikman (London), Ltd., that the Anglo-Chilean Consolidated Nitrate Corporation will join the sales corporation as from July 1, 1929. It is also rumoured that the sales corporation, which was formed up to June 30, 1930, is likely to be extended for a prolonged period in the near future.

Dyestuff Prices

OUR Lancashire dyestuffs correspondent, in his monthly market notes in the DYESTUFFS MONTHLY SUPPLEMENT, draws attention to the considerable price reductions for dyestuffs which have been made by the dyestuffs section of Imperial Chemical Industries. Dyestuff users have long been asking for lower prices, and the reductions now announced will undoubtedly arouse great interest and discussion. At the moment, it is far too early to attempt to explore the situation in all its bearings. The reductions are, however, a very clear indication that I.C.I. has no intention of neglecting the dyestuffs field. Dyestuffs form, in bulk and value, only a small part of the great activities of the company, but it is obvious from this latest movement that the company is determined to keep up to a high pitch of efficiency in every department of chemical industry.

Books Received

THE ORIGINS AND THE GROWTH OF CHEMICAL SCIENCE. By J. E. Marsh. London: John Murray. Pp. 161. 5s.

AN ETYMOLOGICAL DICTIONARY OF CHEMISTRY AND MINERALOGY. By Dorothy Bailey and Kenneth C. Bailey. London: Edward Arnold and Co. Pp. 307. 25s.

The Calendar

Jan.		
14	Ceramic Society. 7.30 p.m.	North Staffordshire Technical College, Stoke-on-Trent.
14	Institute of Metals (Scottish Section): "Recent Developments in the Manufacture of Condenser Tubes." A. Spittle. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
15	Royal Institution: "Critical Phenomena in Saturated Solutions." F. A. Freeth. 5.15 p.m.	21, Albemarle Street, London.
15	Institute of Metals (N.E. Coast Section): "Some Aspects of Steam Turbine Development and Application." R. Dowson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne
16	Society of Chemical Industry (Newcastle Section): "Tar Distillation." Lecture I. S. A. Wikner.	Armstrong College, Newcastle-on-Tyne
16	Society of Chemical Industry and Institute of Chemistry (Glasgow Sections): Lecture on Artificial Silk. W. P. Dreaper.	Glasgow.
16	Institute of Chemistry (Huddersfield Section): "Spiropyans and the Formation of Coloured Ions.	Huddersfield.
16	Society of Glass Technology. 2.30 p.m.	Manchester.
16	Leicester Literary and Philosophical Society: "Present-day Methods of Water Softening." J. P. O'Callaghan. 8 p.m.	College of Technology, Leicester.
16	Society of Chemical Industry (Nottingham Section): "The Distillation of Wood." F. G. Conyers. 7.30 p.m.	University College, Nottingham.
17	Society of Dyers and Colourists (Midlands Section): "Swelling of Fibres." A. J. Hall. 7.30 p.m.	Leicester Technical College
17	Society of Dyers and Colourists (West Riding Section): "The Analysis of Dyestuffs, Yesterday, To-day, and To-morrow." Professor H. E. Fierz-David.	Bradford.
17	University College, London: "The Chemistry of Some Natural Drugs." Dr. H. R. Ing. 5 p.m.	Gower Street, London
17	Institute of Chemistry and Society of Chemical Industry (Edinburgh Section): "X-ray Analysis of Crystals." Dr. J. D. M. Ross. 7.30 p.m.	The North British Station Hotel, Edinburgh.
17	Optical Society: Ordinary Meeting. 7.30 p.m.	Imperial College of Science and Technology, London.
17	Institute of Metals (Birmingham Section): "Refractories for use in Metallurgical Furnaces." A. J. Dale. 7 p.m.	Waterloo Street, Birmingham.
17	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
18	Institution of Chemical Engineers: "The Reactivities of Solid Carbon in Fuel Processes." Professor John W. Cobb. 6.30 p.m.	Institution of Civil Engineers' Theatre, Great George St., London.
18	West Cumberland Society of Chemists and Engineers: "Special Steels." H. E. Kershaw. 7 p.m.	Workington.
18	Society of Dyers and Colourists (Scottish Section): "The Action of Swelling Agents on Artificial Silks." A. J. Hall.	Glasgow.
18	Society of Dyers and Colourists (Manchester Section): "The Standardisation of Fastness of Dyestuffs on Dyed Fabrics." Dr. S. G. Barker. 7 p.m.	36, George Street, Manchester.
18	Oil and Colour Chemists' Association: "The Examination of Paints." Dr. J. J. Fox.	Manchester.

Casein and its Industrial Applications.—(1)

By W. L. Davies, Ph.D., M.Sc., F.I.C.

(Of the National Institute for Research in Dairying)

The production of various materials of commercial value from casein is a growing industry. In view of the increasing attention which is being paid to this dairy by-product, the following article is of great interest.

Casein, or more correctly *caseinogen*, is the most important protein of mammalian milk. The term " casein " of English literature is equivalent to " paracasein " of American literature, and applies to the form which is precipitable from milk by rennet. Casein (called caseinogen in English scientific literature) is the product which is precipitated by acids from milk, but, in industry, the loose term " casein " is applied to both forms.

The wide distribution of casein in various milks has been known throughout the ages, the casein and milk fat being the major constituents of cheese and milk curds, and even now cheese for consumption is made from the milk of reindeer, camels, and llamas.

Casein belongs to that important class of compounds, the proteins, and chemically, it is considered a conjugated protein, where the protein molecule proper is conjugated to a phosphoric grouping—casein is a phospho-protein. In milk, casein is in colloidal suspension as calcium caseinogenate (or caseinate)[1], a material which is capable of being dispersed in water to form highly concentrated, yet stable, colloidal solutions. When milk is boiled, coagulated calcium caseinate forms as a scum, and the milk will then cease to behave normally to rennet. Heating to 120–130° C. coagulates the caseinate, but the action is reversible.

The Preparation of Casein

Casein is prepared from skim milk by the addition of a slight excess of dilute acids. Washing of the curd with water, redissolving in alkali, and reprecipitation with dilute acid is resorted to until the product is as free of ash as possible, after which drying at a low temperature is carried out.

Butter-fat is the most objectionable impurity in casein, both for industrial and scientific purposes. Extraction of the curd with fat solvents is unsatisfactory, owing to the envelopment of the fat particles by the curd preventing total removal, as well as possible denaturation of the product with some solvents (carbon disulphide, petroleum ether and carbon tetrachloride especially). The best way is to centrifuge the original milk free from fat by passing it repeatedly through a milk separator, first in the raw state and then after making alkaline with dilute caustic soda. The casein is then precipitated with dilute acid in an almost fat-free condition. Drying in a vacuum at low temperature is resorted to owing to the denaturing effect of a temperature of 100° C. on the dry material.

Pure Casein by the Hammarsten Method

There are two methods of preparing pure casein, namely, those of Hammarsten[2], and van Slyke and Baker[3]. The Hammarsten method consists of diluting the repeatedly-centrifuged milk with four volumes of water and adding 10 per cent. acetic acid, with constant stirring, until it is present in excess to the extent of 0.75–1.0%, that is, to make the *pH* of the medium equal to that of the isoelectric point of casein, namely, 4.6. Lactic acid may be substituted for acetic acid.

The curd is washed by decantion with very dilute acetic acid of *pH* 4.6 until all calcium salts are washed out. The casein is then dissolved in 0.1 *N* caustic soda, the solution filtered through asbestos, and the casein precipitated from solution by making acid with acetic acid to *pH* 4.6. This re-solution and re-precipitation is repeated twice. The curd is collected on a cloth, and washed thoroughly with 95 per cent. alcohol several times, the alcohol being subsequently washed out with ether. The product is then extracted with ether in a Soxhlet, and finally dried in an oven at 60° C.

The Method of van Slyke and Baker

The van Slyke and Baker method consists in adding very slowly to the fat-free milk either normal lactic acid or a mixture of equal quantities of normal acetic acid and normal hydrochloric acid. The vessel is provided with an automatic stirrer which works adjacent to the very fine nozzle of the burette delivering the acid. Acid at the rate of 45 c.c. per litre of milk should be delivered every 30 minutes, and the acid is added until 60 c.c. per litre of milk has been totally delivered. A sample of the milk, on dilution with water and centrifuging, should throw down its casein completely. The curd is then collected by centrifuging, and washed and dried in the same way as in the Hammarsten method, except that it is advisable to dry the product as a thin layer in the open air.

Chemistry of Casein

Owing to its nature, experimentation with casein is difficult. Its solutions are colloidal and cannot be filtered except when very dilute. The solutions cannot be kept for any length of time owing to the fact that they are such excellent media for micro-organic growth, and even in the actual preparation of the substance different reagents split off different groupings from the parent molecule.

Casein contains six elements, its percentage composition not being exactly agreed upon, but the following are closely approximate figures[2] :—Carbon, 52.96 per cent. ; hydrogen, 7.05 per cent. ; nitrogen, 15.65 per cent. ; sulphur, 0.785 per cent. ; phosphorus, 0.847 per cent. ; and oxygen, 22.708 per cent. The empirical formula according to Hammarsten[2] is $C_{172}H_{274}N_{44}SPO_{55}$ (molecular weight 8,888).

Casein is a white (or creamy), ashless, odourless and tasteless solid. It is very hygroscopic in its dry condition, and in its air-dry state contains up to 8 per cent. of moisture, 2 per cent. of which it retains in vacuo at 70° C. It acts both as an acid and a base, and its equivalent weight differs according to its method of reaction. One gram of pure casein unites with 7.0 c.c. of 0.1*N* dilute acid, but will unite with 9.0 c.c. of 0.1 *N* alkali, although investigators are not in agreement about the latter (variations from 8.3 to 9.0 c.c.). Its equivalent weight as an acid is 1,111, and it possesses a basicity of eight in the basic caseinates. As a base, its equivalent is 1,428.5. Of the eight different caseinates possible, four have already been prepared.[4] The isoelectric point of casein, that is, the point at which it gives an equal number of hydrogen and hydroxyl ions, is at a *pH* of 4.6.

Like all phosphoproteins, it is distinctly acid. It turns litmus red, is a stronger acid than carbonic acid, and can displace carbon dioxide from carbonates. It is slightly soluble in water, least so at its isoelectric point. Various denaturing treatments decrease its solubility in water. It is insoluble in the ordinary organic solvents, but dissolves with possible decomposition in 50 per cent. alcohol, concentrated phenol, and pyridine. Casein is slightly soluble in aqueous neutral salt solutions, readily soluble in alkalis, alkali carbonates and bicarbonates, and solutions of basic salts. It dissolves in 10 per cent. borax solution, 5 per cent. ammonium chloride and sulphate solutions. Moist casein is more soluble than dry casein in dilute solutions of mineral acids. The best concentration of acid for solution appears to be 0.01*N*. Strong solutions of acids and alkalis dissolve casein but hydrolyse it readily.

Casein Solutions

Casein solutions are viscous and colloidal, especially if concentrated. If warmed, the solutions become more limpid but the original viscosity returns on cooling. The viscosity of casein solutions increases rapidly with increasing concentration and with lowering of temperature, both phenomena being explained by the increasing hydration[5] of the colloidal particles.

Preparation of Rennet Casein

Under the action of rennin (the hydrolytic enzyme of the rennet of commerce), the casein molecule is split into two identical parts, which combine with calcium salts to form the insoluble calcium paracaseinate. The curdy precipitate, ripened by suitable processes, gives the cheese of commerce.

Fresh fat-free milk at 38° to 40° C. is treated with rennet (Hansen's rennin preparation) in the proportion of 1 c.c. to 8½ gallons of milk, and the temperature is kept constant until precipitation is complete, which is indicated by the curd sinking to the bottom of the container. Heating to nearly

100° C. is then resorted to, to destroy the rennin. After cooling, the supernatant liquid is siphoned off. Washing several times with distilled water is carried out, and excess water is finally squeezed out by pressing in a cloth. The curd is dried in a manner similar to acid casein.

By the above method, owing to the curd being a calcium salt, the ash-content is appreciable. Ash-free curd can be prepared from the washed curd prepared as above by dissolving the material in a large volume of very dilute ammonia, adding the ammonia until the curd has dissolved. After filtration through absorbent cotton, dilute acetic acid is added to reprecipitate the curd. This solution and reprecipitation is repeated, several times. Finally, after solution in ammonia, ammonium oxalate solution (20 c.c. of saturated solution for every litre of milk used) is added, the solution being allowed to stand for twelve hours before centrifuging and filtering through a double filter paper. Dilute hydrochloric acid is used to precipitate the curd from the filtrate. The curd is washed with water, then alcohol and ether, and dried at a low temperature.

Properties of Rennet Casein

Rennet casein is a white solid, insoluble in water and the usual organic solvents, slightly soluble in neutral salt solutions, and completely soluble in warm 5 per cent. sodium chloride solution and in hot 50 per cent. alcohol. Like acid casein, it is soluble in solutions of alkali and alkaline earth hydroxides, carbonates and bicarbonates. Rennet casein is acid, but being amphoteric (according to which side of its esoelectric point the material is being studied) it forms salts with both acids and bases, and these salts have the same properties as the corresponding salts of acid-precipitated casein.

On warming, moist rennet casein becomes very plastic, and can be drawn out into fine threads, but this glutinous property is destroyed by drying and by heating. As with acid-precipitated casein, rennet casein forms acid and neutral caseinates. These are white solids, soluble in water but insoluble in alcohol. Neutral salts and salts of heavy metals precipitate them from solution, the higher the valency of the metal, the lower being the concentration necessary for precipitation to occur, while the precipitates formed by salts of metals of Group II are soluble in excess of the reagent. Heavy metals also gradually denature the protein complex. The cleavage products of rennet casein have been the subject of much study in investigation with the examination of cheese-ripening.

Plant for Preparation of Casein

The United States claim priority in the technical preparation of casein, and the industry is comparatively young. Whereas about 25 years ago the production amounted only to a few tons, it has increased to thousands at the present time. This enormous growth in production fails to satisfy the demand, and efforts are made to produce casein from all manner of dairy by-products.

The plant required for manufacture is not extensive or costly; a few additions to the plant of a modern creamery only are necessary, and there is little trouble involved in getting machinery of the capacity needed. Roughly, the requirements are: storage tanks, vats, pumps, presses, curd mill, drying plant and tables. The tanks and vats can be of wood or glass-lined sheet iron, but for storage, concrete lined with a thin layer of acid resisting material is useful. Rotary pumps with ample lengths of flexible hose are the most efficient. The precipitation vats of tinned sheet iron should be water- or steam-jacketed, and about 4 ft. in depth, so as to facilitate the handling of the curd. The ordinary cheese press and curd mills[6] are quite applicable, but a heater attached to the mill gives a finer product for drying. For drying, vacuum, tube or tunnel driers are used, the latter being the most efficient. The drying trays consist of wooden frames covered with fine mesh galvanised netting (16 per inch), on which the milled curd is spread in thin layers. Press cloths should be of robust material, such as duck or burlap.

Finely ground casein is whiter than the coarser material, and, for industrial purposes, uniformity in size of the casein particles is important. The dried casein must therefore be ground in a mill fitted with a set of sieves, while the ground material is graded according to particle size. The ground material, stored in grain-sacks, will keep indefinitely in a cool, dry place.

Technical Preparation of Casein

There are three kinds of casein on the market—namely: (*a*) Ordinary casein (acid precipitated); (*b*) Rennet casein; and (*c*) Buttermilk casein. The last is an impure form of acid casein. The kind of casein used depends on the product desired. Thus acid casein is best for glues and paints, but rennet casein is best for plastics.

Cow's milk (2.5 to 3.5 per cent. of casein) is most widely used, but in the southern parts of Europe goat's milk (2.8 to 3.2 per cent. of casein) is extensively used, while in India, the milk of the buffalo is attaining importance (2.9 to 3.5 per cent. of casein). Skim milk is always used, and for the best grade, sweet skim milk is of first importance, but quite good grades can be made from slightly sour milk. The casein content of milk is determined by precipitating the casein from a known volume of milk by a slight excess of acetic acid and determining the nitrogen in the washed curd by the Kjeldahl method. The casein is the perecentage of nitrogen multiplied by the factor 6.38.

The objectionable impurities in technical casein are butter-fat, ash, sugars, acidity and putrefactive organisms. Fat is detrimental to the material in the paper industry, impairs the adhesive qualities of glue, and causes paints to peel off. Acidity means that larger amounts of alkali are needed for solution, or that acid caseinates of low plastic power are formed. Sugars cause dried casein to caramelise, giving a product with a poor colour. Ash is not so objectionable as the above, but a high ash content means a poorer glue. Casein absorbs odours readily, and casein from putrefied milk is not an inviting product.

The prevention of the occurrence of these impurities is a much easier process than their removal. Butter-fat is exhaustively extracted by centrifuging the skim milk repeatedly, after rendering alkaline with soda or bicarbonate in a milk separator. Extraction of the final product with fat solvents is both costly and inefficient, and tends to give a denatured product. Acidity and sugars are controlled by careful precipitation and thorough washing, and the use of an acid forming a soluble calcium salt ensures a low ash content. Bad odours can be prevented by rejecting putrefied batches of milk, cleanliness in processing, and care in drying and storing the product.

(To be concluded)

Dry Grinding and the Dust Problem

THERE has long been a distinct need for a satisfactory method of collecting the dust generated during dry grinding operations. That this dust is extremely harmful when inhaled by human beings is very well known, but to eliminate the danger and provide hygienic conditions is by no means an easy matter. It is now required by law that efficient methods of dealing with this dust problem shall be employed, but space limitations very often make it almost impossible to adopt a method better than that of blowing dust into the open air. To meet this need the Visco Engineering Co., Ltd., 162, Grosvenor Road, London, have introduced the Visco self-contained dust collector unit. The Visco self-contained dust collector outfit for grinders consists of an efficient exhauster and the dust collector. The exhauster is a special type for dust work suitably mounted on the grinder itself or alongside it on a separate pedestal, and in some cases on the collector casing. It is usually driven by belt from the grinder shaft, though with some machines an independent motor may be necessary. The exhauster suction inlet is connected to the grinder cowls. The discharge branch delivers the dust-laden air directly into the collector, which has only two parts, a rectangular box and a Visco filter cell. The air leaves through the filter cell. The collecting efficiency is stated to be so perfect that the air can be allowed to escape directly into the workroom.

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(1) Hammarsten, *Zeit. f. Physiol. Chem.* (1883), **1,** 227.
(2) Hammarsten, *Zeit. f. Physiol. Chem.* (1885), **9,** 273.
(3) Van Slyke and Baker, *J. Biol. Chem.* (1918), **35,** 127.
(4) Bosworth and van Slyke, *J. Biol. Chem.* (1913), **14,** 207.
(5) Chick and Martin, *Zeit. f. Chem. u. Indust. der Kolloide* (1913), **12,** 69; (1912), **11,** 102.
(6) Dahlberg, *U.S. Dept. of Agr. Bulletin,* 661 (1918).

The Hydrogenation of Coal

Mr. J. Ivon Graham on Work Done at Birmingham

At a meeting of the London Section of the Society of Chemical Industry, held at Burlington House, London, on Monday, Mr. J. Ivon Graham read a paper on "The Action of Hydrogen upon Coal," in which he gave an account of the work that had been done on this subject at the Mines Research Laboratory in Birmingham University, financed by the Colliery Owners' Research Association. Mr. Graham is the Assistant Director of the Laboratory.

MR. GRAHAM first spoke of the early work with the Bergius system, and said that the research by the Colliery Owners' Research Association was started in Birmingham in 1923, because it was felt that the process might result in great benefits not only as regards the production of oil, but also to the coal industry, inasmuch as it would involve the production of an additional ten million tons of coal, at least, per annum. The work in Birmingham University had been done by using a mixture of 200 grams of coal with 100 grams of pure phenol in a gas-heated steel-ribbed autoclave of three litres capacity, using a temperature of 430° C. and a pressure of 150 atmospheres.

Part Played by Composition of Coal

The results—a considerable number of which were shown on lantern slides—generally bore out Bergius' claim that the greater proportion of the original coal could be hydrogenated, but the conclusion had been come to, as the result of the Birmingham experiments that—contrary to the view expressed by Bergius—the constitution and composition of the coal played a very important part in the results obtained. The conclusion had also been arrived at—again contrary to what Bergius had thought at first—that the use of a catalyst improved the degree of hydrogenation and reduced the amount of residue. At the same time the figures obtained at Birmingham, mainly on British coals, did not indicate the same degree of hydrogenation as did those given by Bergius in a paper which he read in Germany in 1925, and Mr. Graham inferred that the coals used in Bergius' experiments were brown coals.

The best results obtained by Mr. Graham had been with the para-bituminous coals according to Seyler's classification. On the whole, the experiments at Birmingham showed a lower yield of oil and a higher yield of residue than in the case of Bergius' own work, although an exact comparison could not be made for the reason that Bergius did not give the ultimate analysis of the coals which he used. The pressures employed by Bergius were higher than those used by the author, but with the coals used at Birmingham very little better results had been obtained with an increased pressure.

Effect of Catalysts

Mr. Graham then referred to the use of catalysts and their effect upon hydrogenation, and quoted results of experiments using nickel oxide, nickel oxalate, and ammonium molybdate. Using these materials as catalysts the residue was reduced, using a certain coal, from 18·2 per cent to 9.6 per cent., 7·2 per cent., and 5·5 per cent. respectively. This, of course, meant a higher oil yield.

For commercial success, however, continued Mr. Graham, something more was required than the production of a thick tar oil with 10 per cent. of kerosene and 5 per cent. of petrol —which were the average results—together with 12 per cent. of gas. At one time Bergius had specifically stated that the use of a catalyst was unnecessary, but the opposite view was now suggested. As a matter of fact, the I.G. now claimed to be able, by hydrogenation, to separate the oil into various constituents to meet the fluctuating needs of the market, a claim of considerable importance. It had also been stated that the I.G. was producing 70,000 tons of gasolene annually, of which 40,000 tons were made from coal, by hydrogenation.

Discussion

Dr. W. R. Ormandy said he was responsible for 2½ years for the research work carried out on British coals in the Bergius laboratory, and what was done there on a more or less commercial scale discounted to a very considerable extent all the work done in bombs—as compared with continuous working—and it discounted still more the utilisation of such a material as phenol as the suspending medium. Much better results, too, would have been obtained at Birmingham had the investigators concentrated upon one coal, using varying pressures and temperatures to ascertain which would give the best results, than by using the one pressure and temperature upon such a large number of coals. In any case, he did not consider that the results obtained with phenol were any justification for drawing deductions as to what might be done on the commercial scale.

With regard to the use of catalysts, it was not to be assumed that because Bergius did not refer to the use of catalysts in his patents that he was unaware of their influence. As a matter of fact, iron was added by Bergius ostensibly to remove the sulphur, but he, personally, very much doubted whether Bergius was so stupid as not to appreciate that it also acted as a catalyst, although the patent said Bergius did not work with a catalyst. As regards the large output of gasolene by the I.G., it was significant that a considerable quantity of low temperature tar was finding its way to the I.G. from all parts of Germany, and it was a question whether the German tract was not largely hydrogenating low temperature tar and not coal. Given optimum pressure and temperature, there were a large number of British coals which gave as much as 93 per cent. conversion into oil.

Dr. Lessing's Views

Dr. R. Lessing said that credit was due to those who started the laboratory work at Birmingham before the large scale work at the Fuel Research station and Billingham was begun. So far as the influence of catalysts was concerned, he had never had the slightest doubt on this point; and Bergius himself, when he was able to speak a little more freely—for reasons which need not be gone into—at the first coal conference at Pittsburg, admitted it. If, as had been suggested, the I.G. were hydrogenating low temperature tars, that might inspire those concerned with low temperature carbonisation, inasmuch as one of their products would form the first stage in the final process for producing the large quantities of oil which would be required in the future.

The whole problem of hydrogenation was too much in a state of flux at the moment for the full economic effect to be gauged. At the same time, it was highly probable that the further work now being carried out in regard to the process would indicate that large quantities of coal could be hydrogenated perhaps in plants which were very much cheaper than those at present in use or contemplated, so that they would then have to deal with a very large industry. At the present moment, however, any hopes the mining industry might have were not too near realisation, because the total amount of coal being treated by the process in Germany was only a fraction of 1 per cent. of the total produced.

Dr. P. Dvorkowitz said that if assistance had been given to low temperature processes similar to that given by the British Government to the Bergius system—which had been helped to the extent of £25,000—it would have been possible by now to produce all the oil they required, by low temperature processes.

Dr. W. H. Coleman said that at the moment he was almost a pessimist as regards the hydrogenation of coal becoming a commercial process.

Engineering Difficulties

Mr. H. G. Shatwell said he was concerned with the experiments at Birmingham when they were first started, and claimed that the methods adopted there had been the right ones, inasmuch as they indicated the best types of coals to be used for the purpose. At the same time, he said, it was almost a national scandal that such a small amount of research work had been done by the coal industry in this country. The coal owners had spent less money on research work than any other body of employers here. He did not think the engineering difficulties associated with high pressure work had yet been solved sufficiently to allow the process to be carried out on a practical scale, and he believed he could state definitely

that the work that was being done in Germany was largely devoted to the hydrogenation of low temperature tars, and that coal was not treated at all.

Dr. Cullen asked the author for his views with regard to the commercial possibilities of the process. He imagined that the answer would depend upon the engineering of the subject, and the price at which hydrogen could be obtained, but no doubt Mr. Graham had formed some ideas as the result of the investigations he had carried out.

Mr. Graham, replying to the points raised, said that in the discussion at the Pittsburgh Coal Conference, Herr Krausch, a director of the I.G., stated that some proportion of the oil produced by that concern by hydrogenation was obtained by the direct distillation of coal. He did not feel qualified to answer the questions as to the commercial possibilities of the process, although he had formed some opinions. He believed it would have economic possibilities when catalysts were combined in it. Considerable advances were being made in high pressure work generally, and the cost of hydrogen would no doubt be reduced. At the same time, he did not think the final commercial process would be on the lines put forward by Bergius. Further, the economics of such a process could not be worked out until we knew the price likely to be obtained for oil. What he felt was that the hydrogenation process should be persevered with, because, unlike the low temperature carbonisation process, it meant that additional coal would be required and, in addition, it did not leave a large percentage of solid residue to be disposed of.

A hearty vote of thanks to the author, proposed by the chairman, was seconded by Dr. J. S. Haldane, F.R.S., Director of the Mines Research Laboratory, and carried.

British Chemical Engineer in U.S.

American Admiration

A HUNDRED and seventy employees and several pensioners of William Butler and Co. (Bristol), Ltd., tar and resin distillers, welcomed Mr. E. W. Butler back from America at a supper given them by the firm at the Crews Hole Works on Saturday, December 31. Dr. T. Howard Butler, who was in the chair, said that the purpose of the supper was two-fold, namely, to give his audience a happy evening and to welcome their director, Mr. E. W. Butler, back from his eighteen months' sojourn in America, where he has been superintending the construction of the firm's Pittsburgh factory. The speaker took the opportunity of stressing the importance of co-operation between all parties in the firm. Each employee should consider himself as a cog in the machine, and unless each cog performed its function properly the machine would not continue to run smoothly. Dr. Butler particularly welcomed the firm's pensioners, only four of whom were absent.

Mr. E. W. Butler said that the Pittsburgh distillation plant was the biggest of its kind in the world, and it had been erected in record time—twelve months from the day the ground was broken to the day the plant started work.

Mr. J. Edwards, manager, remarked that as a result of Mr. Butler's visit to the States, some of America's greatest industrialists, whatever their attitude had been in the past, had now a profound admiration for the genius of the British chemical engineer. Mr. Eric Butler, as a result of his training at Crews Hole, had played a great part in the design and erection of what was believed to be the largest tar plant in the world. A little bit of Crews Hole brain had been planted in the States.

Public Lectures at University College, London

THE diary of public lectures at University College, London, for the second term of session 1928–29 includes the following, all open to the public without fee or ticket :—A course of six lectures on "The Chemistry of Some Natural Drugs," by Dr. H. R. Ing, on Thursdays, January 17, 24, 31, February 7, 14, 21, at 5 p.m., subjects including the alkaloids of Atropa belladona, coca, cinchona, opium, etc.—Three lectures on "The Properties of, and Methods of estimating, some Therapeutic Agents," by Dr. J. H. Burn, on February 27 and 28, and March 1, at 5 p.m.—A public inaugural lecture on "The Four Component Systems in Peace and War," by Dr. F. A. Freeth, F.R.S., Honorary Lecturer in the Theory and Practice of Heterogeneous Equilibria.

Duddell Medal for Dr. C. E. Guillaume

Award for Work on Alloys

THE Council of the Physical Society has awarded the sixth (1928) Duddell Memorial Medal to Dr. Charles Edouard Guillaume, the Director of the Bureau International des Poids et Mesures, Sèvres, France. The medal is awarded annually to some one who has contributed to the advancement of knowledge by the invention or design of scientific instruments or by the discovery of material used in their construction.

Dr. Guillaume is known to the scientific world for his production of three alloys of great importance—Invar, Elinvar and Platinite. The latter is a nickel steel (46 per cent. nickel), having approximately the same temperature coefficient of expansion as glass, so that it can be fused into glass and used as the wire for introducing the current into electric incandescent lamps. The wire is frequently covered with a thin coating of copper to which the glass adheres, and in this form the wire is known as "red platinum." As about one thousand million lamps are made annually the saving between the cost of platinum wire, which was the only suitable material formerly available, and the alloy approximates to £1,000,000 per annum. Invar, a nickel steel discovered in 1896, contains 36 per cent. of nickel and has a very small temperature coefficient of expansion, so that if a surveying tape is made of it the length is almost unaffected by temperature. This quality is of the greatest service in accurate surveying work and has reduced the time taken in such a survey to 1-50th of that taken in a survey of a few years ago. The pendulum rods of all modern first-class clocks are made of the same material. Elinvar was produced by Dr. Guillaume for the manufacture of the balance springs of watches, and contains 36 per cent. of nickel and usually 12 per cent. of chromium. The coefficient of elasticity of elinvar does not change with temperature, so that the control exerted by the spring does not vary with temperature, and this immensely improves the behaviour of the watch to which it is fitted. It is estimated that about 5,000,000 watches are made annually in which the balance springs are of this material.

Dr. Guillaume was appointed Director of the Bureau des Poids et Mesures in 1915, and received the Nobel Prize for Physics in 1920.

Willard Gibbs Medal Awarded to Dr. C. S. Hudson

DR. C. S. HUDSON, chief of the Chemistry Division of the Hygienic Laboratory, U.S. Public Health Service, since November 1, 1928, has been awarded the Willard Gibbs Medal of the American Chemical Society for 1929, in recognition of his researches on sugars and other carbohydrates. These researches were conducted in the Bureau of Standards, where Dr. Hudson was employed from 1923 to November, 1928, and in the Bureau of Chemistry of the Department of Agriculture, where he served from 1908 to 1918. The value of his researches has already been recognised by the bestowal on him in 1916 of the Nichols Medal. The Willard Gibbs Medal is awarded for eminent work in, and original contributions to, pure or applied chemistry. Previous recipients of this medal have been, since 1911 :—Svante Arrhenius, T. W. Richards, L. H. Baekeland, Ira Remsen, A. A. Noyes, W. R. Whitney, E. W. Morley, W. M. Burton, W. A. Noyes, F. G. Cottrell, Mme. Curie, Julius Stieglitz, G. N. Lewis, M. Gomberg, Sir James C. Irvine, J. J. Abel, and W. D. Harkins.

Explosion at Gasworks

THIRTEEN men received minor burns when a gas pipe fired on Monday at the Gas Light and Coke Co.'s works at Nine Elms Lane, Battersea. In each case the burns, which were mainly to the face and hands, were only slight. Some of the men were treated in hospital, but were not detained. The gas fired in a pipe in the basement of the premises, where all the men were working. In an official statement, the Gas Light and Coke Co. gave the following explanation of the accident :—"In the course of carrying out some work which was being done in connection with a new laboratory, some gas was accidentally allowed to escape from a pipe which had been disconnected. The gas ignited, causing a slight explosion. A number of men engaged on the work at the time received slight burns, for which they received attention at St. Thomas's Hospital, and they were afterwards sent home."

Dangerous Occurrences Notification

Order Issued by Home Secretary

UNDER the title Statutory Rules and Orders, 1928, No. 87, "The Dangerous Occurrences Notification Order, 1928, dated November 9th, 1928, made by the Secretary of State under the Notice of Accidents Act, 1906 (6 Edw. 7. c. 53)," the Home Secretary has made the following order :—

"In pursuance of Section 5 of the Notice of Accidents Act, 1906, I hereby extend the provisions of the said Act requiring notice of accidents in factories and workshops to be given to an Inspector, to the following classes of occurrences in a factory or workshop (including any place which, for the purpose of the provisions of the Factory and Workshop Act, 1901, with respect to accidents is a factory or workshop, or is included in the word factory or workshop, or is part of a factory or workshop) whether personal injury or disablement is caused or not :—

"All cases of—I. Bursting of a revolving vessel, wheel, grindstone or grinding wheel moved by mechanical power ; II. Breaking of a rope, chain, or other appliance used in raising or lowering persons or goods by aid of mechanical power ; III. Explosion or fire causing damage to the structure of any room or place in which persons are employed, or to any machine or plant contained therein, and resulting in the complete suspension of ordinary work in such room or place or stoppage of machinery or plant for not less than five hours, where such explosion or fire is due to (i) the ignition of dust, gas or vapour, or (ii) the ignition of celluloid or substances composed wholly or in part of celluloid, or (iii) electrical short circuit, or failure of electrical apparatus ; IV. Explosion or fire not included in paragraph III affecting any room in which persons are employed and causing complete suspension of ordinary work therein for not less than 24 hours.

"This Order may be cited as the Dangerous Occurrences Notification Order, 1928, and shall come into operation on January 1, 1929, from which date the Order dated December 22, 1906, made under the said Section shall be revoked."

Lord Bledisloe and the Imperial Grassland Association

OWING to various developments which have taken place in connection with the fertiliser interests of Imperical Chemical Industries, Ltd. (particularly the formation of Scottish Agricultural Industries, Ltd.) and to the inauguration by the Government of the Agricultural Credits Scheme, the project which the company had in mind for the inauguration and support of a special Imperial Grassland Association has proved unnecessary and incapable of complete realisation without duplication and overlapping of effort. Lord Bledisloe, who had been invited to become the chief of this new organisation (and who, it will be remembered, relinquished his membership of the Government with that object in view) has retired from his association with the project. While regretting this step and acknowledging Lord Bledisloe's willingness and ability to undertake the work which would have been entailed had the scheme been proceeded with, Imperial Chemical Industries, Ltd., realised, in view of the developments which have taken place, that it had no alternative but to release Lord Bledisloe. At the same time, the company is pleased to announce that it has obtained Lord Bledisloe's consent to a continuance of his assistance in an advisory and consultative capacity on agricultural questions generally.

Artificial Silk Chemicals

AN interesting and handsome exhibit of artificial silk chemicals and dyes will be shown at the Artificial Silk Exhibition from January 21–26 by Imperial Chemical Industries, Ltd.

The British Dyestuffs Corporation, Ltd., has always kept well to the fore in the field of dyestuffs for artificial silks. "Duranol" colours for the dyeing of cellulose acetate silks are in extensive use, and for the obtaining of level shades on irregular qualities of viscose "Icyl" colours are made. In addition to this range there is also a wide range of direct acid, basic, sulphur and vat colours. On the stand will be models suggestive of the link between the chemical products and the manufacture of artificial silk and dyestuffs. The chemical products manufactured by I.C.I. include among many others the following : acetic acid, carbon bisulphide, caustic soda, soda ash, sodium sulphide, nitro-cotton.

A Boom in Inventions

To the Editor of THE CHEMICAL AGE.

SIR,—The number of patent applications filed during the last year reached the record total of 38,593, an increase of 3,124 over the year 1927, and the largest number ever taken out in one year, the previous record being in 1920, when 36,672 patent applications were filed. Patent activity is frequently regarded as an index of the state of trade, and the above is, therefore, a very welcome sign that this country is beginning to return in some degree to its pre-war prosperity. As in previous years, inventive activity has been very marked in the chemical, electrical and transport industries, while the introduction of television, talking films, gramophone pick-ups, etc., has resulted in numerous patents being taken out on the subjects.—Yours, etc.,

GEE & CO.

British Enka New Capital

IN a circular to shareholders the board of the British Enka Artificial Silk Co. say that unexpected technical difficulties, which necessitated reduced output and increased production costs and affected the quality of output, are now believed to have been overcome. Production, they add, is now satisfactory, and the manufacture of the finer qualities of artificial silks will shortly be undertaken. Additional capital, however, is required. Slackness of trade has necessitated the financing of output on an unexpectedly heavy scale, while requirements for capital expenditure were in excess of previous estimates. A temporary loan for £220,000, therefore, was contracted with the Maekubee Co. and the Union Corporation. It is estimated that, subject to stocktaking and after charging about £16,000 to development account, there may be a small operating profit for 1928, before allowing for debenture interest, head office expenses, and depreciation. To strengthen the financial position the directors, acting under their powers, have increased the capital to £1,250,000 by creating 250,000 new £1 ordinary shares, which have been subscribed at 26s. each, free of commission, and paid for in full by the Maekubee Co. and the Union Corporation. A condition was that the shares should be offered to the general body of shareholders on the same terms, the company bearing any expenses incidental to that offer. The right is therefore given to shareholders to purchase the shares in the proportion of one new share for every complete four shares held. The issue provides £325,000, out of which the loan referred to has been liquidated, while the recent sale of an important parcel of the company's product has reduced the stock to small dimensions and further added to the financial resources.

Salt in Canada

AN increase of 60 per cent. in the production of Nova Scotia salt mines is recorded for the past year, the output being 20,000 tons, as against 12,500 tons for the previous twelve months. Last summer Malagash Salt Products, Ltd., placed in operation an up-to-date evaporating plant consisting of three pans with a daily capacity of 15 tons. This enabled the company to place upon the market an evaporated salt of very fine quality which immediately met with the favour of consumers. The Premier of Alberta reports that two substantial groups of industrialists are making inquiries relative to the salt deposits recently discovered in Northern Alberta at Waterways, the present northern terminal of the Alberta and Great Waterways Railway. At this point drillers recently tapped a 200-ft. bed of salt, declared by the Provincial Analyst to be 99 per cent. sodium chloride. Three samples brought down from the well were found to have a strength of slightly over one and a half pounds per gallon.

Asbestos Merger Trade Policy

WITH reference to the recent amalgamation of Bell's United Asbestos Co., Ltd., with Turner and Newall, it is announced that, as regards packings, jointings and general engineering supplies, it was not found possible to harmonise the sales policy of Turner Brothers Asbestos Co.—a branch of Turner and Newall—with that of Bell's United Asbestos Co., in that the Turner Brothers Co. make no distribution of these products direct to users. The goodwill in this trade, therefore, has been disposed of to an independent company trading under the name of Bell's Asbestos and Engineering Supplies.

From Week to Week

RECENT WILLS INCLUDE: Mr. Joseph Birkett Whitaker, of Fisher Mount, Kendal, colour manufacturer, £13,553.

THE MARRIAGE is announced of Professor J. W. McBain, F.R.S., to Dr. M. E. Laing. The ceremony took place on Tuesday, January 1, at Stanford Memorial Church, Stanford University, California.

APPLICATIONS for the following appointments are invited in our advertisement columns:—Principal of the Technological Institute, Cawnpore.—An assistant chemist for analyses of agricultural and brewing materials.

THE LATENT LABORATORIES announce that their address is now as follows: "Willing House," 356/60, Gray's Inn Road, King's Cross, London, W.C.1. Telephone, Terminus 4728/9; telegrams, Latentlab, Kincross, London.

A LIST of new justices of the peace for Cornwall issued on Saturday, January 5, includes the name of Mrs. Bickford-Smith, of Trevarno, Helston, wife of Mr. J. C. Bickford-Smith, J.P., of Bickford-Smith and Co., safety fuse manufacturers, Tucking Mill, Camborne.

THE LEAGUE OF NATIONS has been informed that Belgium and Egypt have ratified the protocol concluded at Geneva in 1925 prohibiting the use of poison gas. Other parties to the protocol are Austria, France, Italy, Liberia, Soviet Russia and Venezuela.

PROFESSOR G. BARGER, F.R.S., has been appointed president of Section C (Chemistry) for the meeting of the British Association for the Advancement of Science which will take place in South Africa in July and August this year. The relation between science and industry will be one of the main topics of discussion at the meeting.

MR. U. R. EVANS, of King's College, Cambridge, will deliver the annual lecture of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers at the annual meeting of the Institute during the week of February 18, 1929. Mr. Evans will lecture on corrosion, and later will lecture in various centres of the United States.

ARTIFICIAL SILK NEWS.—The Bemberg company is asking the permission of the shareholders to increase the capital, which is at present 28,000,000 marks.—The fourth exhibition of British Artificial Silk Goods will take place in the period January 21–26, at the New Hall, Olympia, London, W. The exhibition will be opened on January 21 by Sir Robert Horne.

THE DEVON COUNTY COUNCIL invites tenders for the supply to the North Western Division of the rural main roads for the 12 months ending March 31, 1930, of refined tar, bituminous compounds, oils, grease, etc. Details are available from the County Surveyor for the North Western Division, Mr. R. M. Stone, 9A, High Street, Barnstaple, by whom tenders must be received on or before January 25.

THE DEPARTMENT OF OVERSEAS TRADE announces that the Commercial Counsellor at Buenos Aires (Mr. H. O. Chalkley, C.B.E.) has forwarded to the Department a short memorandum on the casein industry in Argentina. British firms desirous of receiving a copy of this memorandum should apply to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Reference No. BX. 4996 should be quoted.

DR. VAN DER BYL, chairman of the South African Iron and Steel Industrial Corporation, denies the report recently circulated that the Government representatives on the Corporation had concluded an agreement with the German Gütehoffnungshütte company appointing Dr. Lilge as manager of the projected steel works, at a salary of £7,000 per annum, and appointing the German firm to act as consulting engineers for a fee of £100,000.

A COURSE of four lectures on "Some Applications of Physical Chemistry to Steel Manufacture" will be given by Dr. Andrew McCance (managing director of the Clyde Alloy Steel Co., Ltd.), at the Imperial College, Royal School of Mines, Prince Consort Road, South Kensington, London, S.W.7, on January 23, 24, 30 and 31, at 5.30 p.m. At the first lecture the chair will be taken by Mr. F. W. Harbord, late president of the Iron and Steel Institute. Admission is free, without ticket.

THE U.S. DEPARTMENT OF JUSTICE has instituted proceedings against the German Potash Syndicate and the Société Commerciale des Potasses d'Alsace, alleging that the combination has been formed to control the distribution and sale of potash. The Quai d'Orsay intervened through the French Embassy in the United States, on the ground that the French company was largely owned by the French Republic, and was therefore immune from legal proceedings, but the motion was denied, and the case is being continued.

THE SECRETARY FOR MINES announces that Sir Thomas Mottram, Sir Richard Redmayne, and Mr. Thomas Richards retired from the Safety in Mines Research Board at the end of the year on the completion of their period of office. The ordinary rule is that retiring members are not eligible for reappointment for twelve months after retirement, but in Sir Thomas Mottram's case there are exceptional circumstances which have justified a departure from the rule. In these circumstances he has been reappointed for a period of two years.

DR. IRVING LANGMUIR has been elected president of the American Chemical Society.

MR. C. A. NELSON, managing director of the Pelaw Main Collieries, has joined the board of Continuous Coal Carbanisation.

MR. A. J. C. BULT has been appointed secretary of the Electrolytic Zinc Co., of Australasia, Ltd., in succession to Mr. E. H. Shackell.

THE ANGLO-FOREIGN PULP CO., LTD. announces that the offices of the company are now at 3, Laurence Pountney Hill, London, E.C.4. Telephone, Mansion House 5848; telegrams, Donaupulp, Cannon, London.

BRITISH DRUG HOUSES, LTD., have issued their catalogue of B.D.H. fine chemical products, including organic and inorganic chemicals, analytical reagents, indicators, standard stains, etc., revised to January, 1929. The catalogue covers 130 pages.

PROFESSOR A. H. WHITE, Professor of Chemical Engineering at the University of Michigan, has been elected president of the American Institute of Chemical Engineers in succession to Dr. E. R. Weidlein. Dr. H. C. Parmelee has been re-elected secretary.

SHAREHOLDERS of the International Nickel Co., meeting at Toronto on Thursday, January 3, endorsed a by-law to increase the capital by 3,750,000 shares of preferred stock at a par of $5. This is a step in the arrangements for a merger of the International Nickel Co. and the Mond Nickel Co.

PROFESSOR HANS FISCHER has, according to German Press reports, succeeded in synthesising hæmatin, an iron-containing substance obtained by the action of glacial acetic acid on hæmoglobin, the red colouring matter of blood. The synthesis is said to have been announced in the course of an address to the Munich Chemical Society.

AN INTERNATIONAL CONFERENCE convened by the International Women's League for Peace and Liberty, dealing with modern methods of warfare, especially the use of poison gas, was held in Frankfort, Germany, last week-end. One delegate expressed the view that it was impossible to control the chemical industry so as to prevent it from making poison gas for warfare.

BEET SUGAR NEWS.—The areas devoted to sugar beet cultivation in England and Wales will be considerably extended in 1929 and 1930.—The sugar beet factory at Norton Fitzwarren, near Taunton, is being equipped forthwith to deal with 25,000 tons of beet by the Oxford drying process during the 1929 season. This will be the first factory in the world, outside Oxfordshire, to adopt the new process.

SURFACE POTASH DEPOSITS which have long been known to exist at the Pintados Salina on the Tamarugal Pampas of Northern Chile are, it is reported, to be commercially exploited by a newly-formed company, known as the Sociedad Chilena Explotadora de Potash. The new concern also plans the extensive exploitation of such other salts as nitrate of potash, which are said to exist in considerable quantities in this region.

INCREASES IN IMPORT DUTIES on unclassified chemicals of 25 to 40 per cent. are claimed by the United States chemical manufacturing industry in a petition to the Congress Ways and Means Committee, which has begun the consideration of the readjustment of tariffs. There is also a claim for an increase in the duty on tartaric, nitric and citric acids, and that concentrated fruit juices should be taken off the free list and charged 5 cents per lb., as they are a source of citric acid.

Obituary

DR. CHARLES ROBERT YOUNG, on Wednesday, December 26, 1928. He collaborated with Professor Purdie in researches on the sugars. During the war he was successively assistant secretary and secretary of the Scientific Advisory Committee of the Trench Warfare Department of the Ministry of Munitions. After the war he served in the Department of Scientific and Industrial Research.

MR. WILLIAM G. M'KELLAR, late manager of the St. Rollox and Irvine Works of the United Alkali Co., on Sunday, January 6, at his home in Irvine. Mr. M'Kellar was a native of Glasgow, and spent the earlier part of his industrial life in the city. He was trained as a chemist with the Tharsis Sulphur and Copper Co., and as a young man had some notable successes in professional competitions. He is survived by his wife and a son and daughter.

DR. CHARLES JAMES, professor of chemistry and head of the chemical department of the University of New Hampshire, United States, at Boston, on December 10, 1928, aged 48. He was born at Earls Barton, near Northampton, England, and studied chemistry under Ramsay at University College, London, becoming a Fellow of the Institute of Chemistry in 1907. He went to the United States in 1906, and was first employed as a chemist by the National Refining Co., going the same year as instructor to New Hampshire College, where he was promoted to full professor in charge of the department in 1912, receiving from the University of New Hampshire the honorary degree of Doctor of Science in 1928. Dr. James was a member of the American Chemical Society and of the Chemical Society of London, and was awarded the Nichols Medal of the American Chemical Society in 1911. He was the author of over sixty papers published in the *Journal of the American Chemical Society*, chiefly in the field of the rare earths.

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CATALYSIS.—The decomposition of ammonia on iron. A contribution to the knowledge of ammonia-catalysis by iron. A. Mittasch, E. Kusz, and O. Emert. *Zeitschrift Elektrochem*, December, 1928, pp. 829–840. The decomposition of ammonia on carbonyl iron and on iron activated with potassium oxide and aluminium oxide at temperatures below 400° C. is described and discussed.

FERTILISERS.—The development of the production and use of fertilisers. H. Warmbold. *Chemiker-Zeitung*, January 2, pp. 3–4.

GENERAL.—Energy problems and the chemical industry. J. Hess. *Chemische Industrie*, January 5, pp. 1-7.

ORGANIC.—Reactions between sugars and amino-acids. H. von Euler and E. Brunius. *Annalen der Chem.*, Vol. 467, Part 3, pp. 201–216.

Monoacyl derivatives of quinic acid. III.—Synthesis of 4-(*p*-hydroxybenzoyl)quinic acid. K. Josephson. *Annalen der Chem.*, Vol. 467, Part 3, pp. 287–294.

Miscellaneous

ANALYSIS.—Determination of the iodine value. J. J. A. Wijs. *Chimie et Industrie*, December, 1928, pp. 1043–1044 (in French).

ANTI-KNOCKS.—Effect of anti-knock materials on the speed of initial uniform movement of the flame in hydrocarbon-air mixtures. Y. Nagai. *Proceedings Imperial Academy*, Japan, November, 1928, pp. 525–528 (in English).

APPARATUS.—Apparatus with fused-in plates of porous glass. G. F. Hüttig. *Chimie et Industrie*, December, 1928, pp. 1034–1038 (in French).

COAL.—The chemistry of coal in Europe. Hessegie. *L'Industrie Chimique*, December, 1928, pp. 639–641 (in French).

DYESTUFFS.—Studies on dibenzodithiazinequinone, a class of vat dyestuff. V.—On the halogen derivatives. R. Shibata and Y. Asagi. *J. Soc. Chem. Ind. Japan* (supplemental binding), December, 1928, p. 302B (in English).

GENERAL.—Experimental study of the transformation of chromates into bichromates. E. Carrière and P. Castel. *Comptes Rendus*, December, 26, 1928, pp. 1292–1294 (in French).

Viscosity and the acetates of cellulose. M. Deschiens. *Chimie et Industrie*, December, 1928, pp. 1023–1033 (in French).

The potash industry. J. H. Lucas. *Chimie et Industrie*, December, 1928, pp. 1193–1196 (in French).

METHANOL.—Contribution to the study of the synthesis of methanol. E. Audibert. *Chimie et Industrie*, December, 1928, pp. 1015–1022 (in French).

ORGANIC.—The condensation of phthalic anhydride with *o*-dichlorobenzene. M. and N. Tanaka. *Bulletin Chem. Soc. Japan*, November, 1928, pp. 286–287 (in German). Using aluminium chloride as condensing agent, there is obtained, at 115° C., 3¹-4¹-dichlorobenzophenonecarboxylic acid, and, at 150° C. (or at 130° C. under pressure) 2:3-dichloroanthraquinone.

The dehydrating action of Japanese acid earth in the anthraquinone series. M. Tanake and S. Watanabe. *Bulletin Chem. Soc. Japan*, November, 1928, pp. 288–289 (in English). By this means, phthalic anhydride yields, with hydroquinone, quinizarin (1:4-dihydroxyanthraquinone); with cathechol, very small quantities of histazarin and alizarin; with pyrogallol, gallein; and with α-naphthol, α-hydroxynaphthacenequinone.

PAPER.—Factors in the sizing of paper pulp. R. Escourru. *Chimie et Industrie*, December, 1928, pp. 1039–1042 (in French).

STARCH.—The preparation of triacetyl starch and its molecular weight. Y. Tsuzuki. *Bulletin Chem. Soc. Japan*. November, 1928, pp. 276–285 (in English). Starch is acetylated with acetic anhydride in the presence of anhydrous zinc chloride. The triacetyl starch obtained has (by the ebullioscopic and cryoscopic methods) a molecular weight equal to or greater than 18 times anhydroglucose triacetate.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

301,545. 8-Hydroxy Quinoline and Derivatives, Manufacture of. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 2, 1927.

8-hydroxy-quinoline and its derivatives are obtained by heating 8-amino-quinoline or a derivative to about 220° C. in the presence of a reagent having an acid reaction, such as mineral acid or zinc chloride. The reaction is preferably effected in aqueous or aqueous alcoholic solution. Examples are given of the production of 8-hydroxy-quinoline and 6 : 8-dihydroxy-quinoline.

301,561. Aqueous Solutions of Carbon Disulphide, Manufacture of. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 6, 1927.

The object is to obtain clear aqueous solutions of carbon disulphide of any desired dilution. Carbon disulphide is added to a mixture of an alcohol, *e.g.*, amyl or butyl alcohol, and soap, and this mixture is miscible with water or dilute soap solution in any proportion without the formation of an emulsion or a precipitate.

301,562. Acetic Anhydride from Acetic Acid, Manufacture of. A. Carpmael., London. From I.G. Farbenindustrie Akt.-Ges, Frankfort-on-Main, Germany. Application date, September 6, 1927.

Acetic acid dissociates into water vapour and acetic anhydride in the presence of a catalyst at a temperature above 500° C., but the separation of the acetic anhydride and water is difficult. In this invention, the vapours are separated by diffusion through porous material. In an example, the catalyst is placed in a graphite tube arranged within a quartz tube and heated to 600° C. The acetic acid vapour is passed into the graphite tube and a slight vacuum applied to the quartz tube. About 20 per cent. of the water can be removed by diffusion through about 50 cms. length, and the operation is then repeated in a similar apparatus to remove futher quantities of water.

301,565. Alkali Cyanides, Manufacture of. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges, Frankfort-on-Main, Germany. Application date, September 6, 1927.

Alkali cyanides are obtained from alkali hydroxides, or oxides or salts of alkali metals, *e.g.*, sodium, carbonate, sulphide, sulphate, formate, or acetate, by the action of ammonia and carbon monoxide at 400-800° C. The gas mixture acts on the alkali until the water content has reached a maximum, and the gas mixture can be used again after removal of water. If the gases are diluted with nitrogen or hydrogen, the pressure should be increased. The alkali may be mixed with a filler such as magnesium oxide to increase the surface exposed to the gas. If the ammonia and carbon monoxide are greatly diluted, a catalyst such as an iron compound may be added. The alkali cyanide is recovered by lixiviation.

301,577. Hydrogenation or Reduction of Organic Compounds. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 19, 1927.

Catalysts consisting of finely divided metals which are employed in the hydrogenation or reduction of organic compounds are more active if they have been prepared by reduction from their salt solutions with silicon-oxygen compounds of a lower degree of oxidation than SiO_2, at a low or moderate temperature. Such a catalyst can be obtained by reduction of nickel acetate, and may be used for the reduction of nitrobenzene to aniline, nitro-naphthalene to amino-naphthalene, croton-aldeyhde to *n*-butylaldehyde, cinnamic aldehyde to hydrocinnamic aldehyde, oleic acid ester to stearic acid ester, and others. Zinc, copper, platinum or palladium catalysts are obtained in a similar manner.

301,769. Dyestuffs, Production of. L. J. Hooley, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application date, June 1, 1927.

Anthraquinone-acridine-sulphonic acids are obtained by heating α-aryl amino-anthraquinones with sulphuric acid above 90 per cent. strength, or oleum, at a temperature above 130° C. Derivatives containing a carboxylic acid group or an amino group in the ortho position to the amino linkage are excluded, but other substituted α-aryl-amino-anthraquinones such as those having sulphonic acid groups in the aryl nucleus are included. Examples are given of the treatment of dianilido-purpurine with sulphuric acid.

301,775. Gases rich in Olefines from Bituminous Coal, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, September 1, 1927. April 5 and May 22, 1928.

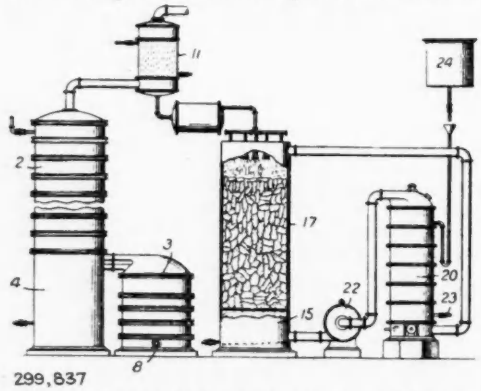
A gas rich in olefines is obtained from bituminous coal by heating the pulverised coal for a very short time to 800° C., and rapidly cooling the resulting gas and coke. The heating is effected by passing the coal by means of superheated steam through a heated reaction chamber, and cooling the products in an adjacent chamber. The coal may be introduced into the central zone of the reaction vessel, and is completely carbonised in the lower part of the vessel, while a furtherde composition of the tar takes place in the upper part of the vessel. Any deposition of the coal and coke is prevented by passing inert substances such as sand through the reaction chamber in conjunction with the coal. The tar produced may be continuously returned to the lower part of the reaction vessel.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—288,214 (I.G. Farbenindustrie Akt.-Ges) relating to dyestuffs, see Vol. XVIII, p. 535 ; 288,266 (Metallbank and Metallurgische Ges. Akt.-Ges.) relating to copper and zinc ores, see Vol. XIX, p. 7 (Metallurgical Section) ; 288,549 (Consortium für Elektrochemische Industrie Ges.) relating to carboxylic acid anhydrides, see Vol. XVIII, p. 555 ; 297,096 (Vereinigte Stahlwerke Akt.-Ges.) relating to obtaining iron from ores, see Vol. XIX, p. 45 (Metallurgical Section) ; 297,416 (I.G. Farbenindustrie Akt.-Ges.) relating to phosphorus or phosphoric acid and binding agents with latent hydraulic properties, see Vol. XIX, p. 497.

International Specifications not yet Accepted

299,837. Distilling Tar Acids. Koppers Co., 800, Union Trust Building, Pittsburg, U.S.A. (Assignees of J. A. Shaw, Mellon Institute, Pittsburg, U.S.A.) International Convention date, November 2, 1927.

Gas liquor is raised to a point just below boiling point and air blown through it to remove phenol, cresol, etc. Gas



liquor obtained from a fixed ammonia still 3, and free ammonia still 4, combined with a dephlegmator 11, is sprayed over coke

in a tower 17 against a current of air. The tar acids are carried off to a Feld washer 20 fed with caustic soda from a reservoir 24, and heated by steam admitted at 23. The air is re-circulated by a blower 22 back to the tower 17.

299,896. FERTILIZERS. F. Uhde, 79, Rathenauallee, Dortmund, Germany. International Convention date, November 3, 1927.

Ammonia is oxidised to nitric acid which is used to treat crude calcium phosphate in quantity such that only calcium carbonate in it is acted upon, yielding calcium nitrate. The remainder of the phosphate is treated with sulphuric acid to obtain phosphoric acid which is treated with ammonia to obtain ammonium phosphate. The calcium sulphate is treated with ammonia and the carbon dioxide obtained in the nitric acid treatment to obtain ammonium sulphate.

300,114. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 5, 1927. Addition to 282,805. (See THE CHEMICAL AGE, Vol. XVIII, p. 224.)

Thioindigo dyes are obtained by the condensation of a derivative of 3-hydroxy-1-thionaphthene substituted in the nucleus with 7-methyl-isatin-α-chloride substituted by halogen or methyl in the 5-position or by halogen or/and methyl in the 4- and 5-positions. The condensation of 5-chlor-7-methyl-3-hydroxy-1-thionaphthene and 4:7-dimethyl-5-chlor-isatin-α-chloride, and other condensations are described.

LATEST NOTIFICATIONS.

302,881. Partitions for separating the electrolytic products in the fusion electrolysis of chlorides, particularly of magnesium. I.G. Farbenindustrie Akt.-Ges. December 23, 1927.

302,891. Process for protecting carbon electrodes from consumption in the atmosphere. I.G. Farbenindustrie Akt.-Ges. December 23, 1927.

302,659. Titanium pigment and paint forming durable outside coating. Soc. de Produits Chimiques des Terres Rares. December 19, 1927.

302,912. Method of carrying out catalytic hydrogenation. Ges. fur Teerverwertung, and Kaffer, Dr. H. December 23, 1927.

302,666. Process of rendering soluble compounds which are sparingly soluble or insoluble in water. I.G. Farbenindustrie Akt.-Ges. December 19, 1927.

302,667. Manufacture of films, threads, or the like from cellulose derivatives. I.G. Farbenindustrie Akt.-Ges. December 19, 1927.

302,698. Process of preserving wood. I.G. Farbenindustrie Akt.-Ges. December 20, 1927.

302,733. Manufacture of synthetic rubber. I.G. Farbenindustrie Akt.-Ges. December 21, 1927.

302,737. Manufacture of artificial resins. Soc. of Chemical Industry in Basle. December 21, 1927.

302,928. Manufacture of acid-wool dyestuffs. I.G. Farbenindustrie Akt.-Ges. December 23, 1927.

302,938. Process of rendering soluble compounds which are sparingly soluble or insoluble in water. I.G. Farbenindustrie Akt.-Ges. December 23, 1927.

302,939. Manufacture of organic bases. I.G. Farbenindustrie Akt.-Ges. December 23, 1927.

302,940. Process for the manufacture of phenyl-methylamino-propanol (synthetic ephedrine). Soc. des Usines Chimiques Rhone-Poulenc. December 23, 1927.

303,347. Catalysts and processes of making same. Mayor, J. P. P. December 31, 1927.

303,138. Manufacture of silica and like adsorbent gels. Silica Gel Corporation. December 30, 1927.

303,006. Manufacture of cellulose esters. I.G. Farbenindustrie Akt.-Ges. December 24, 1927.

303,351. Process for the recovery of nitric acid. I.G. Farbenindustrie Akt.-Ges. December 31, 1927.

303,355. Manufacture and production of alkali metal nitrates. I.G. Farbenindustrie Akt.-Ges. December 31, 1927.

303,021. Production of iso-eugenol. Graesser Monsanto Chemical Works, Ltd. December 22, 1927.

303,022. Process for the manufacture of condensation products of cresol and formaldehyde. Chestakoff, P. December 22, 1927.

303,026. Manufacture of developing dyestuffs. I.G. Farbenindustrie Akt.-Ges. December 24, 1927.

303,115. Process for the manufacture of alkaline earth cyanides. I.G. Farbenindustrie Akt.-Ges. December 28, 1927.

303,168. Preservation of wood. I.G. Farbenindustrie Akt.-Ges. December 29, 1927.

303,068. Process for extracting acetylene from gases. I.G. Farbenindustrie Akt.-Ges. December 27, 1927.

303,123. Manufacture of vat dyestuffs. I.G. Farbenindustrie Akt.-Ges. December 28, 1927.

303,179. Process of producing dyeings. Soc. of Chemical Industry in Basle. December 29, 1927.

303,366. Process for the manufacture of metal compounds. I.G. Farbenindustrie Akt.-Ges. December 31, 1927.

303,368. Fabric-coating composition and method of preparing same. Du Pont de Nemours and Co., E.I. December 31, 1927.

303,375. Manufacture of products of the anthracene series. I.G. Farbenindustrie Akt.-Ges. December 30, 1927.

303,384. Process for producing fast tints on chrome-mordanted fibres. Soc. of Chemical Industry in Basle. December 30, 1927.

Specifications Accepted with Date of Application

272,555. Catalytic preparation of oxygenated carbon compounds. E. I. du Pont de Nemours and Co. June 12, 1926.

277,714. Nitrogenized metallic compounds, Production of. R. B. Goldschmidt and S. Coulier. September 20, 1926.

277,357. Homogeneous mixtures of aliphatic mineral oils or distillates and aliphatic alcohols, Manufacture of and apparatus for the production of. J. Kirschner. September 9, 1926.

279,479. Vat dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. October 20, 1926.

286,206. Hydrogenation of organic substances, especially of the products of distillation of coals and petroleum oils. G. Hugel, M. Paul, and M. Boistel. February 28, 1927.

295,600. Dyestuffs of the anthanthrone series, Manufacture of. L. Cassella and Co., Ges. August 11, 1927. Addition to 260,998.

302,609. Condensation products from phenols and aldehydes, Manufacture and production of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) July 14, 1927.

302,620. Valuable liquid and other hydrocarbons and derivatives thereof and ammonia, Joint manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 17, 1927.

302,629. Hydrogenation of coal and like carbonaceous material. C. H. Lander, F. S. Sinlatt, and J. G. King. September 17, 1927.

302,709. Dyestuffs containing chromium, Manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 15, 1927.

302,740. Hardening of iron, mild steel, and iron alloys. H. Lindhorst. September 28, 1927.

302,750. Acyl derivatives of β-ketonic esters and β-diketones, Manufacture of. Imperial Chemical Industries, Ltd., and S. Coffey. October 6, 1927.

302,759. Aliphatic ketones, Production of. Holzverkohlungs-Industrie Akt-Ges., and K. Roka. October 18, 1927.

302,770. Ortho-oxyazo dyestuffs and an intermediate product, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) October 28, 1927

302,772. Vat dyestuffs of the dipyrazolanthrone series, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) October 31, 1927.

302,773. Azo-dyestuffs and intermediate products, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) October 31, 1927.

302,851. Metallurgy of ores or materials containing tin. E. A. Ashcroft. April 5, 1928.

Applications for Patents

Bakelite Corporation and Wade, H. Manufacture of synthetic resins. 38,066. December 24.

Bebin, P., and Bigourdan, P. E. Manufacture of copper sulphate. 38,422. December 29.

Beckett E. G., Loveluck, R. J., Scottish Dyes, Ltd., and Thomas, J. Production of dyestuffs, etc. 38,325. December 28.

Beckett, E. G., Scottish Dyes, Ltd., and Thomas, J. Production of anthraquinone derivatives. 393. January 4.

Bede Metal and Chemical Co., Ltd., and Burn, R. D. Process for recovery of silver, etc., products. 38,542. December 31.

Birmal Chemical Engineers. Heat exchangers, etc. 38,464. December 31.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of phenolformaldehyde condensation products. 38,305. December 28.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Felting animal hair. 38,306. December 28.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Dyeing acetate silk. 38,307. December 28.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of quinoline compounds. 38,404. December 29.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of cellulose derivatives. 38,405. December 29.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of vanadium compounds. 38,406. December 29.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Printing textile products. 38,407. December 29.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial rubber. 38,408. December 29.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of solutions of the cinchona alkaloids. 281. January 3.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of nitro halogen quinazolines. 401. January 4.
Chemical Works, formerly Sandoz. Process for dyeing chamois leather. 475. January 5. (Germany, January 5, 1928.)
Chestakoff, P. Manufacture of condensation products of cresol and formaldehyde. 38,015. December 24. (France, December 22, 1927.)
Coffey, S. Manufacture of triarylcarbinols. 70. January 1.
Coles, S. O. Cowper-. Manufacture of white lead. 413. January 5.
Coles, S. O. Cowper-. Manufacture of red lead. 414. January 5.
Coles, S. O. Cowper-. Manufacture of zinc oxide. 415. January 5.
Coley, H. E. Manufacture of metallic nitrides, etc. 345. January 4.
Coley, H. E. Manufacture of zinc. 346. January 4.
Coley, H. E. Manufacture of cyanides from nitrogen. 347. January 4.
Coley, H. E. Manufacture of alloys. 348. January 4.
Coley, H. E. Manufacture of barium. 349. January 4.
Coley, H. E. Reduction of carbonates, etc. 350. January 4.
Coley, H. E. Reduction of sulphates. 351. January 4.
Coley. H. E. Manufacture of thorium cerium. 352. January 4.
Coley, H. E. Extraction of gold from ores. 353. January 4.
Compagnie de Béthune. Manufacture of ethylic alcohol from coal distillation gases. 38,386. December 29. (France, December 29, 1927.)
Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissements Kuhlmann. Manufacture of resinous condensation products, etc. 38,591, 38,593. December 31. (France, December 31, 1927.)
Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissements Kuhlmann. Manufacture of varnishes. 38,592. December 31. (France, December 31, 1927.)
Davidson, T. M. Distillation of carbonaceous substances. 38,088. December 24.
Deutsche Gold- und Silber Scheideanstalt vorm. Roessler. Production of pigments, etc. 38,214. December 27.
Graesser-Monsanto Chemical Works, Ltd. Production of isoeugenol. 38,014. December 24. (United States, December 22, 1927.)
I.G. Farbenindustrie Akt.-Ges, and Johnson J. Y. Manufacture of catalysts. 38,069. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of preparations which evolve acetylene. 38,070. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Decolorising oils, etc. 38,071. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Sulphur dyestuffs. 38,072. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of viscose solutions, etc. 38,073. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Deacidification of oils. 38,074. December 24.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Apparatus for production of electrical oscillations. 38,201. December 27.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of dyestuffs. 38,202, 38,204, 38,205. December 27.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Vulcanisation of synthetic rubber. 38,203. December 27.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of naphthodianthrones, etc. 38,206. December 27.
I.G. Farbenindustrie Akt.-Ges, and Imray, O. Y. Liquors for tanning, etc., leather. 38,222. December 27.
I.G. Farbenindustrie Akt.-Ges, and Imray O. Y. Manufacture of esters of O-arylated polyvalent alcohols. 38,401. December 29.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Production of condensation products of benzanthrone series. 38,468. December 31. (March 24.)
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of polymerisation products of diolefines. 38,484. December 31.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Oxidation of organic compounds of high molecular weight. 38,485. December 31.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Recovery of sulphur from solutions of alkali metal polysulphates. 38,486. December 31.
I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of threads, foils, etc. 38,487. December 31.
I.G. Farbenindustrie Akt.-Ges. Manufacture of developing dyestuffs. 38,095. December 24. (Germany, December 24, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of alkaline earth cyanides. 38,199. December 27. (Germany, December 28, 1927.)
I.G. Farbenindustrie Akt.-Ges. Preservation of wood. 38,200. December 27. (Germany, December 29, 1927.)
I.G. Farbenindustrie Akt.-Ges. Extracting acetylene from gases. 38,221. December 27. (Germany, December 27, 1927.)
I.G. Farbenindustrie Akt.-Ges. Viscosimeters. 38,303. December 28. (Germany, January 11.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 38,304. December 28. (Germany, December 28, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of metal compounds. 38,409. December 29. (Germany, December 31, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of products of the anthracene series. 38,505. December 31. (Germany, December 30, 1927.)
I.G. Farbenindustrie Akt.-Ges. and Mond, A. L. Production of soaps. 125. January 1.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of dyes. 159. January 2. (October 24, 1927.)
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Horticultural cold frames, etc. 245. January 3. (September 5, 1928.)
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of electrodes for secondary cells. 334. January 4.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of 2-alkyl-benzanthrones. 470. January 5. (September 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Oxidation of organic compounds. 471. January 5.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Recovery of valuable hydrocarbons, etc. 472. January 5.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of foils, etc. 473. January 5.
I.G. Farbenindustrie Akt.-Ges Precipitating bath for making threads, etc., from viscose. 250. January 3. (Germany, January 5, 1928.)
I.G. Farbenindustrie Akt.-Ges. Packing footwear, etc. 279. January 3. (Germany, January 3, 1928.)
I.G. Farbenindustrie Akt.-Ges. Refining wool fat. 280. January 3. (Germany, January 13, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of basic nitro-derivatives of mesoaminoacridine. 343. January 4. (Germany, January 18, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of carbazole derivatives. 402. January 4. (Germany, January 5, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of water insoluble azo dyestuffs. 484. January 5. (Germany, January 5, 1928.
I.G. Farbenindustrie Akt.-Ges. Manufacture of diazonium fluorosulphonates. 485. January 5. (Germany, January 6, 1928.)
Imperial Chemical Industries, Ltd. Process of producing water gas. 38,515. December 31.
Imperial Chemical Industries, Ltd. Feeding coal pastes, etc. 38,516. December 31.
Imperial Chemical Industries Ltd. Destructive hydrogenation. 38,517, 38,520, 38,521. December 31.
Imperial Chemical Industries, Ltd. Preheating oil, etc. 38,518. December 31.
Imperial Chemical Industries, Ltd. Destructive hydrogenation of fuel. 38,519. December 31.
Imperial Chemical Industries, Ltd. Printing of textile fabrics. 251. January 3.
Imperial Chemical Industries, Ltd. Coating materials. 270. January 3.
Jones, F. W., Sefton-, and Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges. Production of ammonium formate. 38,086. December 24.
Kritchevsky, W. Dye compositions. 38,557. December 31.
Marshall, F. D. Distillation, etc., of carbonaceous materials. 38,335. December 28.
Meuris, H. Manufacture of sulphuric acid. 38,259. December 28. (Belgium, October 6.)
National Aniline and Chemical Co., Inc. Colloidal mono-sodium tetraiodophenolphthalein. 38,568. December 31. (United States, January 21.)
Pennsylvania Salt Manufacturing Co. Manufacture of alkali bicarbonates. 360. January 4. (United States, January 11, 1928.)
Poore, P. Production of acetic acid, etc. 158. January 2.
Schindelmeiser, J. Production of nitrophenols. 103. January 1.
Silesia Verein Chemischer Fabriken. Preparation of diaryl thioureas. 400. January 4. (Germany, March 17, 1928.)
Soc. of Chemical Industry in Basle. Production of dyeings. 38,402. December 29. (Switzerland, December 29, 1927.)
Soc. of Chemical Industry in Basle. Production of fast tints on chrome mordant fabrics. 38,583. December 31. (Switzerland, December 30, 1927.)
Winternitz, R. Cleansing alkali lyes. 244. January 3. (Germany, January 4, 1928.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£19 per ton.

Acid Boric, Commercial.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.

Bisulphite of Lime.—£7 10s. per ton, f.o.r. London, packages free.

Bleaching Powder.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

Borax, Commercial.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags carriage paid any station in Great Britain.)

Calcium Chloride (Solid).—£5 to £5 5s. per ton d/d carr. paid.

Copper Sulphate.—£25 to £25 10s. per ton.

Methylated Spirit 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall., pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised, 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

Nickel Sulphate.—£38 per ton d/d.

Nickel Ammonia Sulphate.—£38 per ton d/d.

Potash Caustic.—£30 to £33 per ton.

Potassium Bichromate.—4½d. per lb.

Potassium Chlorate.—3½d. per lb., ex wharf, London, in cwt. kegs.

Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.

Soda Caustic, Solid.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

Soda Crystals.—£5 to £5 5s. per ton, ex railway depots or ports.

Sodium Acetate 97/98%.—£21 per ton.

Sodium Bicarbonate.—£10 10s. per ton, carr. paid.

Sodium Bichromate.—3½d. per lb.

Sodium Bisulphite Powder, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

Sodium Chlorate.—2½d. per lb.

Sodium Nitrite, 100% Basis.—£27 per ton d/d.

Sodium Phosphate.—£14 per ton, f.o.b. London, casks free.

Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.

Sodium Sulphide Conc. Solid, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

Sodium Sulphite, Pea Crystals.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—6½d. to 6¾d. per lb. Crude 60's, 2s. per gall. 1929—1s. 11d. per gall.

Acid Cresylic 99/100.—2s. 5d. to 3s. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.

Anthracene.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.

Anthracene Oil, Strained.—7¼d. to 8d. per gall. Unstrained, 7¼d. to 7½d. per gall.

Benzole.—Prices at works: Crude, 10d. to 10½d. per gall.; Standard Motor, 1s. 4d. to 1s. 4½d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

Toluole.—90%, 1s. 5d. to 1s. 10d. per gall. Firm. Pure, 1s. 10d. to 2s. 1d. per gall.

Xylol.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

Creosote.—Cresylic, 20/24%, 8½d. per gall.; Heavy, 7d. to 7⅝d. per gall. Middle oil, 5⅞d. to 6⅛d. per gall. Standard specification, 5⅜d. to 5⅝d. per gall. ex works. Salty, 7¼d. per gall.

Naphtha.—Crude, 8½d. to 9d. per gall. Solvent 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent 95/160, 1s. 2d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 3d. per gall.

Naphthalene, Crude.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

Naphthalene.—Crystals, £12 5s. to £14 10s. per ton. Quiet. Flaked, £14 to £15 per ton, according to districts.

Pitch.—Medium soft, 35s. to 37s. 6d. per ton, f.o.b., according to district. Nominal.

Pyridine.—90/140, 4s. 3d. to 6s. 6d. per gall. 90/180, 2s. 3d. to 3s. per gal. Heavy, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

Acid Amidonaphthol Disulpho (1-8-2-4).—10s. 9d. per lb.

Acid Anthranilic.—6s. per lb. 100 %.

Acid Benzoic.—1s. 8½d. per lb.

Acid Gamma.—4s. 6d. per lb.

Acid H.—3s. per lb.

Acid Naphthionic.—1s. 6d. per lb.

Acid Neville and Winther.—4s. 9d. per lb.

Acid Sulphanilic.—8½d. per lb.

Aniline Oil.—8d. per lb. naked at works.

Aniline Salts.—8d. per lb. naked at works.

Benzaldehyde.—2s. 3d. per lb.

Benzidine Base.—3s. 3d. per lb. 100% basis d/d.

Benzoic Acid.—1s. 8½d. per lb.

***o*-Cresol 29/31° C.**—5½d. per lb.

***m*-Cresol 98/100%.**—2s. 3d. to 2s. 6d. per lb.

***p*-Cresol 32/34° C.**—2s. 3d. to 2s. 6d. per lb.

Dichloraniline.—2s. per lb.

Dimethylaniline.—1s. 11d. per lb.

Dinithrobenzene.—8½d. per lb. naked at works. £75 per ton.

Dinitrochlorbenzene.—£84 per ton d/d.

Dinitrotoluene.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

Diphenylamine.—2s. 10d. per lb. d/d.

***a*-Naphthol.**—2s. per lb. d/d.

***B*-Naphthol.**—10d. per lb. d/d.

***a*-Naphthylamine.**—1s. 3d. per lb.

***B*-Naphthylamine.**—3s. per lb.

***o*-Nitraniline.**—5s. 9d. per lb.

***m*-Nitraniline.**—3s. per lb. d/d.

***p*-Nitraniline.**—1s. 8d. per lb.

Nitrobenzene.—6d. per lb. naked at works.

Nitronaphthalene.—1s. 3d. per lb.

R. Salt.—2s. 2d. per lb.

Sodium Naphthionate.—1s. 8½d. per lb. 100% basis d/d.

***o*-Toluidine.**—8d. per lb.

***p*-Toluidine.**—1s. 10d. per lb. naked at works.

***m*-Xylidine Acetate.**—2s. 6d. per lb. 100%.

N. W. Acid.—4s. 9d. per lb. 100%.

Wood Distillation Products

Acetate of Lime.—Brown, £9 15s. to £10 5s. per ton. Grey, £17 10s. per ton. Liquor, 9d. per gall.

Acetone.—£75 10s. per ton.

Charcoal.—£6 to £8 15s. per ton, according to grade and locality.

Iron Liquor.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

Red Liquor.—9d. to 10½d. per gall. 16° Tw.

Wood Creosote.—1s. 9d. per gall. Unrefined.

Wood Naphtha, Miscible.—3s. 6d. per gall. Solvent, 4s. to 4s. 1d. per gall.

Wood Tar.—£3 to £4 per ton.

Brown Sugar of Lead.—£39 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 3d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

Arsenic Sulphide, Yellow.—1s. 9d. per lb.

Barytes.—£5 10s. to £7 per ton, according to quality.

Cadmium Sulphide.—5s. to 6s. per lb.

Carbon Bisulphide.—£25 to £27 10s. per ton, according to quantity.

Carbon Black.—5½d. per lb., ex wharf.

Carbon Tetrachloride.—£45 to £54 per ton, according to quantity, drums extra.

Chromium Oxide, Green.—1s. 2d. per lb.

Diphenylguanidine.—3s. 9d. per lb.

Indiarubber Substitutes, White and Dark.—4⅝d. to 5⅞d. per lb.

Lamp Black.—£32 10s. per ton, barrels free.

Lead Hyposulphite.—9d. per lb.

Lithophone, 30%.—£23 per ton.

Mineral Rubber "Rubpron."—£13 12s. 6d. per ton, f.o.r. London.

Sulphur.—£10 to £12 per ton, according to quality.

Sulphur Chloride.—4d. to 7d. per lb., carboys extra.

Sulphur Precip. B.P.—£55 to £60 per ton.

Thiocarbamide.—2s. 6d. to 2s. 9d. per lb., carriage paid.

Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.

Vermilion, Pale or Deep.—6s. 10d. to 7s. per lb.

Zinc Sulphide.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, Pure, 80%.—£39 per ton ex wharf London in glass containers.

Acid, Acetyl Salicylic.—2s. 4d. to 2s. 5d. per lb.

Acid, Benzoic, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

Acid, Boric B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—2s. 1d. to 2s. 3d. per lb.
Acid, Gallic.—2s. 8d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—7s. 3d. per lb. Resublimed, 8s. 3d. 10½d. per lb.
Acid, Salicylic, B.P. pulv.—1s. 4½d. to 1s. 6d. per lb. Technical.—10½d. to 11½d. per lb.
Acid, Tannic B.P.—2s. 8d. to 2s. 10d. per lb.
Acid, Tartaric.—1s. 4½d. per lb., less 5%.
Acetanilide.—1s. 5d. to 1s. 8d. per lb. for quantities.
Amidol.—7s. 6d. to 9s. per lb., d/d.
Amidopyrin.—7s. 9d. to 8s. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
Atropine Sulphate.—9s. per oz.
Barbitone.—5s. 9d. to 6s. per lb.
Benzonaphthol.—3s. to 3s. 3d. per lb. spot.
Bismuth Carbonate.—9s. 9d. per lb.
Bismuth Citrate.—9s. 3d. per lb.
Bismuth Salicylate.—8s. 9d. per lb.
Bismuth Subnitrate.—8s. 3d. per lb.
Bismuth Nitrate.—Cryst. 5s. 9d. per lb.
Bismuth Oxide.—12s. 3d. per lb.
Bismuth Subchloride.—10s. 9d. per lb.
Bismuth Subgallate.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
Bismuthi et Ammon Liquor.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts., 11d. per lb.
Borax B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
Bromides.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
Calcium Lactate.—B.P., 1s. 3d. to 1s. 5d. per lb.
Camphor.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
Chloral Hydrate.—3s. 2d. to 3s. 4d. per lb.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. per lb.
Ethers.—S.G. ·730—11d. to 1s. 0d. per lb., according to quantity; other gravities at proportionate prices.
Formaldehyde, 40%.—37s. per cwt., in barrels ex wharf.
Guaiacol Carbonate.—4s. 6d. to 4s. 9d. per lb.
Hexamine.—1s. 11d. to 2s. 2d. per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
Hydroquinone.—3s. 9d. to 4s. per lb., in cwt. lots.
Hypophosphites.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
Iron Ammonium Citrate.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
Iron Perchloride.—18s. to 20s. per cwt., according to quantity.
Iron Quinine Citrate.—B.P., 8½d. to 9½d. per oz., according to quantity.
Magnesium Carbonate.—Light commercial, £31 per ton net.
Magnesium Oxide.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
Menthol.—A.B.R. recrystallised B.P., 21s. 6d. per lb. net; Synthetic, 10s. to 11s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
Mercurials B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph., B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
Methyl Salicylate.—1s. 3d. to 1s. 6d. per lb.
Methyl Sulphonal.—8s. 9d. to 9s. per lb.
Metol.—9s. to 11s. 6d. per lb. British make.
Paraformaldehyde.—1s. 9d. per lb. for 100% powder.
Paraldehyde.—1s. 4d. per lb.
Phenacetin.—2s. 5d. to 2s. 8d. per lb.
Phenazone.—3s. 9d. to 4s. per lb.
Phenolphthalein.—6s. to 6s. 3d. per lb.
Potassium Bitartrate 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
Potassium Citrate.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb., in cwt. lots.
Potassium Iodide.—16s. 8d. to 17s. 2d. per lb., according to quantity.
Potassium Metabisulphite.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 5½d. per lb., spot.
Quinine Sulphate.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
Resorcin.—2s. 10d. to 3s. per lb., spot.
Saccharin.—47s. per lb.; in quantity lower.
Salol.—2s. 3d. to 2s. 6d. per lb.
Sodium Benzoate, B.P.—1s. 8d. to 1s. 11d. per lb.
Sodium Citrate, B.P.C., 1911—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
Sodium Ferrocyanide.—4d. per lb., carriage paid.
Sodium Hyposulphite, Photographic.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
Sodium Salicylate.—Powder, 1s. 6½d. to 1s. 7d. per lb. Crystal, 1s. 7d. to 1s. 8d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 1d. per lb.
Sodium Sulphite, Anhydrous.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
Sulphonal.—6s. 6d. to 6s. 9d. per lb.
Tartar Emetic, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
Thymol.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

Acetophenone.—6s. 6d. per lb.
Aubepine (ex Anethol).—11s. per lb.
Amyl Acetate.—2s. 6d. per lb.
Amyl Butyrate.—4s. 6d. per lb.
Amyl Salicylate.—2s. 9d. per lb.
Anethol (M.P. 21/22° C.).—5s. 3d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol—1s. 10d. per lb.
Benzyl Alcohol free from Chlorine.—1s. 10d. per lb.
Benzaldehyde free from Chlorine.—2s. 6d. per lb.
Benzyl Benzoate.—2s. 3d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—8s. 6d. per lb.
Citronellol.—10s. per lb.
Citral.—8s. 3d. per lb.
Ethyl Cinnamate.—6s. per lb.
Ethyl Phthalate.—2s. 9d. per lb.
Eugenol.—12s. per lb.
Geraniol (Palmarosa).—20s. per lb.
Geraniol.—6s. 6d. to 10s. per lb.
Heliotropine.—4s. 9d. per lb.
Iso Eugenol.—16s. per lb.
Linalol.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.
Linalyl Acetate.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol. 10s. 6d. per lb.
Methyl Anthranilate.—8s. per lb.
Methyl Benzoate.—4s. per lb.
Musk Ketone.—34s. per lb.
Musk Xylol.—7s. per lb.
Nerolin.—3s. 9d. per lb.
Phenyl Ethyl Acetate.—11s. per lb.
Phenyl Ethyl Alcohol.—10s. per lb.
Rhodinol.—45s. per lb.
Safrol.—1s. 6d. per lb.
Terpineol.—1s. 6d. per lb.
Vanillin.—16s. 6d. per lb.

Essential Oils

Almond Oil.—Foreign S.P.A., 10s. 6d. per lb.
Anise Oil.—2s. 9d. per lb.
Bergamot Oil.—23s. per lb.
Bourbon Geranium Oil.—21s. per lb.
Camphor Oil.—9d. per lb.
Cananga Oil, Java.—12s. per lb.
Cinnamon Oil Leaf.—7s. per oz.
Cassia Oil, 80/85%.—6s. 9d. per lb.
Citronella Oil.—Java, 2s. 1d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 10½d. per lb.
Clove Oil (Pure 90/92%).—9s. 6d. per lb.
Eucalyptus Oil, Australian, B.P. 70/75%.—2s. per lb.
Lavender Oil.—Mont Blanc, 48/50%, Esters, 16s. 9d. per lb.
Lemon Oil.—14s. 9d. per lb.
Lemongrass Oil.—4s. per lb.
Orange Oil, Sweet.—21s. per lb.
Otto of Rose Oil.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
Palma Rosa Oil.—13s. per lb.
Peppermint Oil.—Wayne County, 15s. 6d. per lb.; Japanese, 8s. 6d. per lb.
Petitgrain.—8s. 6d. per lb.
Sandalwood.—Mysore, 28s. per lb., 95% 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, January 10, 1929.

THE amount of business booked during the last week has been very satisfactory, especially in view of the fact that stock-taking is not quite finished in many directions. Moreover, quite a considerable amount of contracts have been booked for forward delivery.

General Chemicals

ACETONE is very firm at £77 to £85 10s. per ton, according to quality, with supplies short.

ACETIC ACID.—Prices are unchanged, with a fair demand.

ACID CITRIC.—There is very little moving in this article, price about 2s. 1d. to 2s. 4d. per lb., less 5%.

ACID LACTIC is unchanged at £43 per ton for 50% by weight, standard pale quality.

ACID FORMIC.—The demand has considerably increased, with prices unchanged at £43 per ton for 85%.

ACID OXALIC.—The increased demand has continued with price unchanged at £30 10s. to £32 10s. per ton, according to quantity.

ACID TARTARIC is unchanged at 1s. 4¼d. to 1s. 4⅜d. per lb., less 5%.

ARSENIC is unchanged.

AMMONIUM CHLORIDE.—The position is quite firm, and certain grades still in short supply.

ALUMINA SULPHATE is firm at £6 15s. to £7 per ton, with short supplies. A large number of contracts have now been placed over the whole of this year.

BARIUM CHLORIDE is very firm and in short supply at about £11 to £11 10s. per ton.

COPPER SULPHATE is unchanged.

CREAM OF TARTAR is in little better demand, with prices unchanged at £95 to £97 10s. per ton for B.P. 99/100%.

FORMALDEHYDE is very firm at £39 per ton.

LACTIC ACID is unchanged at £42 10s. per ton for white and £1 per ton less for brown.

LEAD NITRATE is unchanged at £36 per ton, and in steady demand.

LIME ACETATE.—The position is unchanged, the grey quality still being in short supply and very firm.

LITHOPONE is in good request at £19 10s. to £21 per ton, according to quality.

METHYL ACETONE is unchanged at £58 to £60 per ton for 45%. The material is very firm, and supplies short.

METHYL ALCOHOL is very firm and in good demand.

POTASSIUM CHLORATE is unchanged.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM PERMANGANATE.—Demand is increasing and price unchanged at 5¼d. to 5½d. per lb. for B.P. The position is firm.

POTASSIUM PRUSSIATE is unchanged at £63 10s. to £65 10s. per ton. Some large contracts have been booked during the week.

SODIUM ACETATE.—Supplies for early delivery are still short, and prices unchanged at £21 10s. to £22 per ton.

SODA BICHROMATE.—Considerable business has been booked at the new prices, and the position is firm.

SODIUM CHLORATE is firm at £25 to £26 per ton, and in good demand.

SODIUM NITRATE is firm at £20 per ton, and in good demand.

SODIUM PHOSPHATE is unchanged at £12 per ton.

SODIUM PRUSSIATE remains firm at 4½d. to 5¼d. per lb., and in good demand.

TARTAR EMETIC is in a little better demand at 10½d. per lb.

ZINC SULPHATE is in fair demand at about £12 per ton.

Coal Tar Products

The market for coal tar products shows signs of revival. There is more inquiry and a better tone, although there is little change in prices.

MOTOR BENZOL remains scarce, the price being about 1s. 7½d. to 1s. 8d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is a little weaker, and can be bought in small quantities at 1s. 1½d. per gallon, f.o.r.

HEAVY NAPHTHA is unchanged at 1s. 1d. to 1s. 1½d. per gallon on rails.

CREOSOTE OIL is still quoted at 5¼d. per gallon in the North, and at 6d. per gallon in London, but there are less quantities for sale.

CRESYLIC ACID is still weaker, the 98/100% quality being obtainable with firm orders, at about 1s. 10d. per gallon, and the dark quality 95/97% at 1s. 8d. per gallon, f.o.b.

NAPHTHALENES are more plentiful, the fire-lighter quality being quoted at £4 10s. per ton, the 74/76 quality at £5 per ton and the 76/78 quality at £6 to £6 5s. per ton.

PITCH.—The market continues weak, the price ranging from 35s. to 37s. 6d , f.o.b., according to quality.

Nitrogen Products

Sulphate of Ammonia.—The market continues firm at £10 per ton f.o.b. U.K. port in single bags for January shipment. Producers are quoting a price higher by 2s. per ton for February shipment and onwards. In the home market some of the larger merchants are covering their spring requirements.

Nitrate of Soda.—Good sales continue to be made at scale prices.

Latest Oil Prices

LONDON, January 9.—LINSEED OIL was firm, with a fair inquiry at 2s. 6d. to 5s. per ton advance. Spot, ex mill, £29 10s. ; January, £28 7s. 6d. ; February-April, £28 5s. ; May-August, £28 12s. 6d. ; and September-December, £29, naked. RAPE OIL was quiet. Crude extracted, £41 10s. ; technical refined, £43 10s., naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £30 ; refined common edible, £35 10s. ; and deodorised, £37 10s., naked, ex mill. TURPENTINE was firm, unchanged. American, spot, 49s. ; and February-April, 49s. 9d. per cwt.

HULL, January 9.—LINSEED OIL.—Spot and February, £28 10s. ; February-April, £28 7s. 6d. ; May-August, £28 12s. 6d. ; September-December, £28 15s. per ton, naked. COTTON OIL.—Egyptian crude, spot (new) and January-February, £29 5s. ; edible refined, spot and January-February, £32 10s. ; technical, spot, £32 5s. ; deodorised, spot, £34 10s. per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £36 15s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, £38 ; deodorised, £32 per ton. SOYA OIL.—Extracted and crushed, £32 ; deodorised, £35 10s. per ton. RAPE OIL.—Crude/extracted, £40 15s. ; refined, £42 15s. per ton. TURPENTINE.—Spot, 51s. 3d. per cwt., net cash terms, ex mill. CASTOR OIL and COD OIL unchanged.

South Wales By-Products

THERE is very little change in South Wales by-product activities. Demand continues to be slow, but values generally are maintained. Pitch is quieter, with prices nominal round about 35s. to 37s. per ton. Refined tars have improved slightly, and the tone is healthy. Values, however, are unchanged, coke oven tar being quoted from 7d. to 7⅞d. per gallon delivered, while gasworks tar is unchanged round the 6½d. to 7d. per gallon delivered mark. Crude naphthalene receives little or no attention at 80s. per ton, but whizzed has small calls round the 100s. per ton mark. Patent fuel and coke exports are slightly better, and are showing an improving tendency. There is no change in quotations, the ruling prices being as follows : Patent fuel, ex-ship Cardiff, from 20s. to 21s. 6d. per ton, ex-ship Swansea, 19s. 6d. to 19s. 9d. per ton ; coke, best foundry, 32s. 6d. to 37s. per ton ; furnace, 19s. to 21s. per ton. Oil imports over the last four ascertainable weeks amounted to 19,340,824 gallons.

Retirement of Mr. James Bearn

AT the close of the year 1928, Mr. James Bearn, who is well-known and highly respected in chemical circles generally, retired from the board of Peter Spence and Sons, Ltd., of Manchester, with whom he has been identified for a period of more than half a century. As director and representative Mr. Bearn has travelled extensively in the firm's interests in all parts of the world. The directors, on the occasion of Mr. Bearn's retirement, presented him with a service of silver plate in recognition of his long and valued services.

Tungsten Deposits in Nova Scotia

DURING the past year or two valuable deposits of scheelite, the principal tungsten ore, have been discovered in Nova Scotia, one at Indian Path, Lunenburg County, and the other at Waverley, Halifax County. The work performed by the Indian Path Gold Prospecting Syndicate consisted of cross trenches on the surface and the sinking of a shaft 35 ft. deep. The discovery reported most recently was the find of a large quartz boulder containing scheelite.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, January 9, 1929.

SINCE our last report the heavy chemical market has remained fairly quiet, but from the amount of inquiry going round there is indication that consumers are more hopeful regarding the stability of price, and that the very limited reductions in most of the more called for chemicals have given them a sense of security so far as forward buying is concerned. Acetone remains firm and stocks are comparatively low.

Industrial Chemicals

ACETONE, B.G.S.—£77 10s. to £85 per ton, ex wharf, according to quantity. There is still little available for immediate delivery.

ACID ACETIC, 98/100%.—Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton; powder, £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 6⅜d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Rather easier and now quoted 2s. 4d. per lb., less 5% ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° quality.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf; spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality; dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5%, ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports; spot material quoted £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent; Crystal meal quoted £8 10s. per ton, ex store.

AMMONIA, ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA, CARBONATE.—Manufacturers advise a reduction in price of £1 per ton from January 1. Lump quality now quoted £36 per ton; Powdered, £38 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA, LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA, MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K.

ANTIMONY OXIDE.—Offered for spot delivery at £36 15s. per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt despatch from mines. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Rather firm and now quoted at £10 2s. 6d. per ton, c.i.f. U.K. ports. Prompt shipment from the Continent.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered, in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton f.o.b. U.K. ports.

COPPER SULPHATE, 98/100%.—Market much stronger. Now quoted £26 per ton, ex wharf.

FORMALDEHYDE, 40%.—Some spot material available at about £37 10s. per ton, ex quay.

GLAUBER SALTS.—English material unchanged at £5 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—On offer at £29 10s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted £41 per ton, ex store; brown on offer at about £31 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Manufacturers advise price for delivery during first six months of this year to be 4½d. per lb., delivered U.K. or c.i.f. Irish ports, with allowance of 2½% for minimum 2½ tons to be taken during the period.

POTASSIUM CARBONATE 96/98%.—Offered from the Continent at £25 per ton, c.i.f. U.K. ports. Spot material available at £26 per ton, ex store.

POTASSIUM CHLORATE 99¾/100% POWDER.—Quoted £22 15s. per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6⅞d. per lb. ex wharf. Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Manufacturers advise reduction in the higher strengths. Powdered 98/99% now £17 10s. per ton in drums, £18 15s. per ton in casks. Solid 76/77%, £14 10s. per ton in drums; 70/72%, £14 2s. 6d. per ton in drums, all carriage paid buyers' station, minimum 4-ton lots, for contract 10s. per ton less.

SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. per ton, ex store.

SODIUM BICHROMATE.—No change in price for this year. Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Price during first six months of this year 3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 3s. 9d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOPHOSPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—The Chilian Committee have advised a reduction of 1s. per ton of price ruling up to date. Price for January delivery now £10 7s. per ton, carriage paid buyer's sidings, minimum 6-ton lots. Usual extras for refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices, 50s. per ton, ex works, 52s. 6d. per ton delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 per ton; broken 60/62%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyer's works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra. Prices for this year unchanged.

SULPHUR.—Flowers, £12 per ton; Roll, £10 15s. per ton; Rock, £10 12s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Sulphur Forms in Pittsburgh Coal

A SURVEY of the sulphur forms in coal in a mine in Fayette County, Pa., working the Pittsburgh coal bed, is in progress at the Pittsburgh Experiment Station of the United States Bureau of Mines. Work completed so far indicates that the organic sulphur is fairly constant, sulphate sulphur practically absent, and pyritic sulphur varies, being highest in the top parts of the bed. Complete ash analyses are being made of the different parts of the bed, and the results will be correlated with the softening temperature for the purpose of showing the feasibility of eliminating clinker-forming constituents.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, January 10, 1929.

The weight of business in chemical products on this market during the past week has more closely approached the volume passing before the holiday break. A fair amount of contract business for delivery during the present year has been reported, although in many instances individual orders, especially for consumers in the textile trades, are influenced by the prevailing conditions in the cotton mills. Generally speaking, market values continue steady.

Heavy Chemicals

Prussiate of soda is attracting a fair measure of attention, and quotations are well held at from 4½d. to 5¼d. per lb., according to quantity. Phosphate of soda is also maintained at about £12 5s. per ton, although business in this section is slow at the moment. Hyposulphite of soda is moving off in moderate quantities, with offers of photographic material ranging from £15 5s. to £15 10s. per ton, and of commercial at round £9. Sulphide of sodium is in quiet request, without much change in prices to record, the commercial grade selling at about £8 per ton and the 60–65 per cent. concentrated solid quality at £9 10s. Caustic soda is in fairly steady demand, with makers' offers in contract parcels ranging from £12 15s. to £14 per ton, according to grade. A quiet trade is passing in the case of bleaching powder at somewhat steadier prices than of late, current values being at round £7 5s. per ton. Alkali is on offer at the new contract price of £6 per ton, and a moderate amount of business is going through. With regard to chlorate of soda, inquiry in this section is on moderate lines, with values maintained at 2¾d. per lb. Bicarbonate of soda is well held at about £10 10s. per ton, and buying interest in this material is fairly active. Current offers of saltcake on contract delivery account are on the basis of £2 10s. per ton, a quiet demand for this material being reported. Bichromate of soda is steady and in fair request, with quotations on the basis of 3½d. per lb.

There is only a quiet demand about just now for chlorate of potash, offers of which are in the neighbourhood of 3d. per lb. Bichromate of potash is firm, and is selling in fair quantities on the basis of 4½d. per lb. Permanganate of potash is in comparatively limited demand at the moment, but at 5¼d. to 5½d. per lb. for the B.P. grade and 5d. per lb. for the commercial values are reasonably steady. There is a fair call for yellow prussiate of potash at from 6¾d. to 7¼d. per lb., according to quantity. The demand for carbonate of potash is on a moderate scale, with prices steady at £26 5s. per ton, ex store. With regard to caustic potash, offers of this are still being made at £33 5s. per ton for prompt delivery of 1 to 5-ton lots.

Arsenic continues to attract only a moderate volume of interest from buyers; there has been no further weakness, however, current quotations for this material being at round £16 5s. per ton, at the mines, for white powdered, Cornish makes. There is a steady trade passing in sulphate of copper, and offers of this material are quite firm at about £27 5s. per ton, f.o.b. A fair amount of inquiry is reported for the acetates of lime, and with offers on the short side quotations are firm at £9 per ton for the brown quality and round £17 15s. for the grey. The acetates of lead are in quiet request, with white material at £40 per ton and brown at £39 10s. Nitrate of lead is quiet, but values are maintained at £34 10s. per ton.

Acids and Tar Products

Offers of acetic acid are on a steady basis, and a quietly steady business is being done at £36 per ton for the 80 per cent. commercial and £66 to £67 per ton for the glacial. Oxalic acid is on the quiet side, but values remain at about £1 12s. per cwt. Citric acid quotations are on a somewhat easier basis, and from 2s. 2½d. to 2s. 3d. per lb. has been asked this week for prompt lots. Tartaric acid is steady and in moderate demand at 1s. 4¼d. per lb.

Only a relatively quiet business is passing in the pitch section, with f.o.b. prices round £1 16s. per ton. There has been no apparent expansion in the demand for creosote oil, and offers of this material have an easy tendency at 5d. per gallon. Crystal carbolic is steady and in moderate request at round 6¼d. per lb., f.o.b., with crude 60's material about unchanged at 1s. 10d. to 1s. 11d. per gallon. There is a quietly steady demand about for solvent naphtha at up to 1s. 2d. per gallon.

Dr. F. A. Freeth on Education

Relation to Industry and Commerce

At the North of England Education Conference, held at Newcastle-on-Tyne, on Friday, January 4, Dr. F. A. Freeth, F.R.S. (of I.C.I.), delivered an address on education in relation to industry and commerce. In commerce, he said, there was in many quarters a quite definite opposition to education. Was there anything in the contention that education, and particularly higher education, made a man unfit for business? There was, and it was of the greatest interest to examine the reason. It had been contended that formal and dry education was the most successful in business, and Quakers had been cited in support of that view. The educated man whom he had indicated as unfit for business was the man who entered commerce and despised advice of an intuitive character, but he considered a first-class education rendered a man more fit for eventual success in business if he avoided the danger of the over-confident type of mind. What was wanted was an active understanding rather than a passive acceptance of taught principles.

Dealing with the scientific side of industry, Dr. Freeth said that there was a crying need for the older type of experimental physicist, who was not coming forward in anything like sufficient numbers. Biological science promised astonishing development, but adequate reward for it was not yet devised. If Sir Ronald Ross had been able to produce Ross's malaria mixture bearing a facsimile of the proprietor's signature, he would have certainly reaped a far larger reward than any mark of international gratitude for his distinguished services to humanity. What education could do for industry and commerce was to turn out young men and women with reasonable knowledge and clear, open minds free from fixed ideas.

Statutory Meeting of Acetate Products Corporation

The statutory meeting of the Acetate Products Corporation, Ltd., was held on Monday at the Hotel Cecil, London.

Mr. Morris Greenhill, who presided, said that he was pleased to be in a position to say all was well with the business of the company, and that the publicity had resulted in a widespread inquiry and demand for its principal product, non-inflammable safety celluloid. They had entered into a contract with the Cellulose Acetate Silk Co., Ltd., for the supply of acetate of cellulose on favourable terms. That company was in a position to meet all their requirements as soon as the machinery now under construction was installed. As foreign cellulose acetate was, under the Safeguarding of Industries Act of 1921, subject to an import duty of 33⅓ per cent., they were fortunate in being able to assure supplies of the product from home manufacturers. They had been extremely fortunate in obtaining the best possible technical advice and assistance in connection with the equipment of the works and the manufacture and disposal of their products. Everything possible had been and would be done to ensure that their machinery was up-to-date, and the board was advised that when it was complete it would compare favourably with, if it did not excel, any plant of its kind in the world. In addition to the principal part of the company's business, namely, the manufacture of non-inflammable safety celluloid, the company had acquired an old-established business with several hundred active customers on its books. Not the least remunerative business in which the company was engaged was the manufacture of cellulose lacquers.

Du Pont-Grasselli Merger Ratified

The shareholders of the Grasselli Chemical Co., of Cleveland, Ohio, have ratified the action of the directors authorising the acquisition of the properties and business of that company by E. I. du Pont de Nemours and Co., of Wilmington, Del. The Grasselli Co. will transfer its entire properties and business, after which it will be dissolved. The acids and heavy chemical properties and business acquired from the Grasselli Co., together with the acids and heavy chemicals business of the du Pont Co., comprised in its pigments and heavy chemicals division, will be transferred to a new company, the Grasselli Chemical Co. The explosives business will be merged with the du Pont explosives department.

Company News

ALLEN LIVERSEDGE.—An interim dividend of 5 per cent. actual, is announced.

BROKEN HILL SOUTH.—An interim dividend at the rate of 5 per cent. has been declared, payable on February 22.

ELECTROLYTIC ZINC CO. OF AUSTRALASIA.—The directors declared a dividend at the rate of 12 per cent. per annum for the six months ended December 31, 1928, on the whole of the issued shares.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

PAINT, VARNISH AND COLOURS.—A Indian firm of commission agents and merchants at Karachi are desirous of obtaining the agencies of British manufacturers of the abovementioned lines for the following territories:—Sind, Punjab and Baluchistan (including Delhi). (Reference No. 11.)

PUMPING EQUIPMENT.—The City of Cape Town Electricity Department is calling for tenders, to be presented in South Africa by February 20, 1929, for the supply of pumping equipment for dealing with storm water and unscreened sewage. (Specification No. 445/28.) (Reference No. A.X. 7345.)

WOOD SPIRIT.—The Egyptian Customs Administration is calling for tenders, to be presented in Alexandria by March 15, for the supply of 135,000 kilos of wood naphtha (wood spirit). (Reference No. B.X. 5006.)

Public Lectures on Chemical Engineering

AN important and instructive discourse will be heard in the Institution of Civil Engineers, Westminster, London, on Friday, January 18, when Professor John W. Cobb, Livesey Professor of Coal Gas and Fuel Industries in the University of Leeds, will lecture before the Institution of Chemical Engineers. This event forms one of the series of public lectures recently inaugurated by this body. Professor Cobb has chosen for the subject of his lecture "The Reactivities of Solid Carbon in Fuel Processes," a theme which he has made his own in connection with the work carried on under his direction at Leeds. Professor Cobb proposes to discuss, *inter alia*, how the reactivities of solid carbon (whether as coal or coke) in fuel processes arise, both in furnaces and in producer gas and water gas practice; the characteristics and properties of cokes produced under different conditions; the relation between the reaction and the surface exposed; determinations of reactivity; and possibilities of the future. The lecture will be illustrated by lantern slides. There will be no charge for admission, and all those interested in the subject are cordially invited to apply for tickets (to admit two) to the Honorary Secretary, Institution of Chemical Engineers, Abbey House, Westminster, London, S.W.1. The chair will be taken by Sir Alexander Gibb, President of the Institution, at 6.30 p.m.

New Metallising Process

AT a luncheon held on Tuesday at the Ritz Hotel, London, by the Einstein Electro-Chemical Process, Ltd., there were exhibited specimens, such as aero-propellor blades, wooden tables, cloth, chinaware, picture frames, and the like, which had been subjected to the Einstein process. By this process of electro-plating non-conductors of electricity, it is claimed to be possible to produce, simply and very cheaply, any and different thicknesses of metal coating upon the substance treated, be it glass, fabric, chinaware, wood, or the like. Anti-splintering, anti-corrosive, fireproof, waterproof, and similar properties can, it is said, be conferred upon materials which, although hitherto lacking them, had, nevertheless, been employed for certain uses. Treatment by this new process will thus greatly enhance their value in the existing spheres of their utilities, while a number of new uses will doubtless be found for them by reason of the present innovation. The Einstein Electro-Chemical Process, Ltd., the parent company, is to be a British concern. Its present headquarters are c/o W. Ladenburg and Co., 16, St. Helen's Place, London, E.C.3.

Water Sterilisation by Gaseous Chlorine

An Interesting Handbook

GREAT progress has been made during recent years in the method of sterilisation by means of a small trace of chlorine added to water or sewage, a process that has now become almost universally adopted for the treatment of public drinking supplies, swimming baths, and the like.

On this subject the Paterson Engineering Co., Ltd., have recently published the fifth edition of their handbook "Water Sterilisation by Gaseous Chlorine"—one of the most comprehensive and up-to-date trade publications on the subject so far produced. After giving a history of the development of chlorination and details of the various applications of this treatment to water and sewage, the book describes and illustrates the standard types of chloronome for sterilisation of small and large supplies. The standard types of chloronome have a very wide range varying from two or three thousand gallons per day to over 70,000,000 gallons per day—the largest sized machine being capable of treating the latter volume of water.

A new and very interesting development is the automatic type of chloronome which has been designed for dealing with those cases where the flow of water varies from hour to hour, as, for example, where it is required to chlorinate the flow of water from a reservoir, such flow varying with the rate of consumption. The automatic chloronome has been devised for the purpose of controlling the chlorine flow by means of the varying differential head set up by a fluctuating flow of water through a venturi tube. This head is utilised to operate a special valve which combines the function of the pressure reducing and the flow regulating valves in such a way that an increase of water flow produces a proportionate increase of chlorine gas and *vice versa*, the rate of chlorine addition at any time being indicated on a scale.

The hand-book deals with the various applications of chlorination, including drinking water sterilisation, swimming bath water disinfection (for which a special type of apparatus is described), disinfection of sewage and sewage effluents, and the treatment of condenser circulating water.

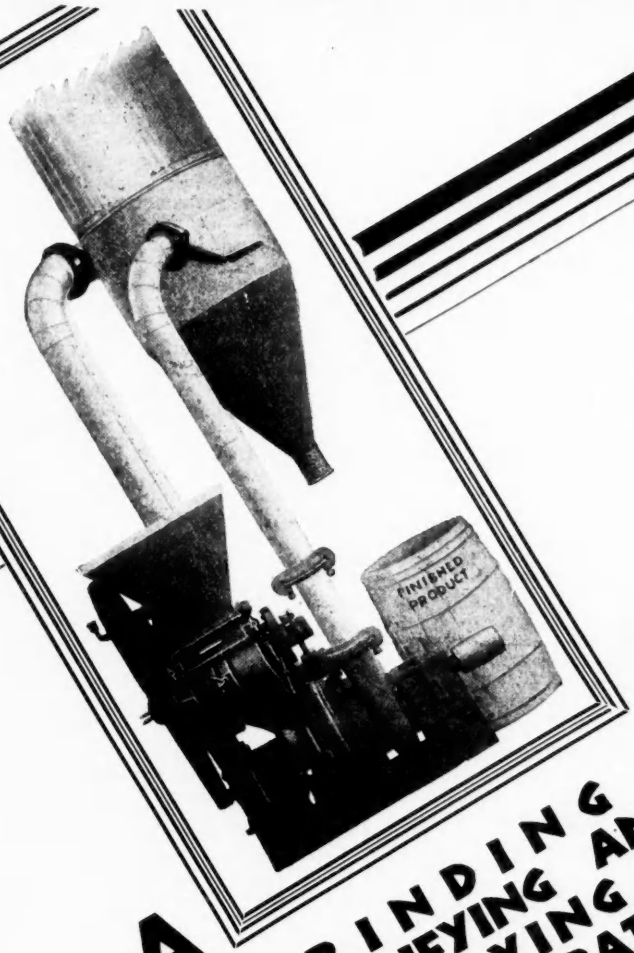
The Chloroscope—an ingenious device for ascertaining the free chlorine content in treated waters—is fully described for the first time, and useful information is included in the book regarding superchlorination and dechlorination. On the subject of chloramine treatment—the addition of liquid chlorine and ammonia to affect sterilisation—particular reference is made to a plant of 33,000,000 gallons daily capacity installed by the Paterson Engineering Co. for the Paris Water Board. The book closes with a list of installations of the chloronome in Great Britain and all parts of the world, from which it appears that practically 2,000,000,000 gallons of water are being sterilised daily by this apparatus.

Optical and Physical Societies' Exhibition

THE annual exhibition of the Physical Society and the Optical Society was held on Tuesday, Wednesday and Thursday at the Imperial College of Science, London. Among the firms exhibiting apparatus of chemical interest were the following: Baird and Tatlock (London), Ltd., Bakelite, Ltd., R. and J. Beck, Ltd., Bellingham and Stanley, Ltd., British Hanovia Quartz Lamp Co., Ltd., Cambridge Instrument Co., Ltd., W Edwards and Co., Electroflo Meters Co., Ltd., Foster Instrument Co., A. Gallenkamp and Co., Ltd., J. J. Griffin and Sons, Ltd. and Baird and Tatlock, Ltd., Adam Hilger, Ltd., Negretti and Zambra, L. Oertling, Ltd., and Thermal Syndicate, Ltd.

Institute of Fuel Arrangements

THE meeting of members of the Institute of Fuel which was to have been held on January 9 has been postponed until January 16. The paper which Mr. H. A. S. Gothard was to have presented has unavoidably had to be cancelled, but in place of it, a paper entitled "Continental Experience in Pulverised Fuel Practice" will be presented by Mr. Berg and Mr. E. Vogt, of Cologne, on January 16, in the rooms of the Chemical Society, Burlington House, London. The chair will be taken promptly at 6 o'clock by Dr. R. Lessing, F.I.C., F.Inst.F., and a general discussion will follow the reading of the paper.



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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

FAYARD (H.) AND FILS, LTD. (Eck and James Branch), 72A, Angell Road, Brixton, manufacturing chemists. (C.C., 12/1/29.) £15 3s. 6d. July 17.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

HANCOCK (JAMES) AND SON, LTD., Worcester, colour manufacturers. (M., 12/1/29.) Registered December 19, £2,700 debentures (secured by Trust Deed dated November 28, 1928); charged on properties in Willow Street, Worcester, and Furlong Lane, Burslem, subject, etc., also general charge. *£7,500. September 8, 1928.

KIRKUP (PHILIP) AND CO., LTD., Sunderland, grease manufacturers. (M., 12/1/29.) Registered December 20, £1,550 mortgage, to J. G. Kirkup, 39, Belle Vue Park, Sunderland, and another; charged on Grease Works, Portobello Lane, Monkwearmouth. *Nil. May 11, 1928.

Satisfaction

HANCOCK (JAMES) AND SON, LTD., Worcester, colour manufacturers. (M.S., 12/1/29.) Satisfaction registered December 20, £6,100, registered July 6, 1908.

London Gazette, &c.

Companies Winding Up Voluntarily

BOHOMO OIL CO., LTD. (C.W.U.V., 12/1/29.) At an extraordinary general meeting of the members of the said company, duly convened, and held at Broadway House, Bromley, Kent, on Monday, December 10, the following resolution was duly passed; and at a subsequent extraordinary general meeting on December 24 the said resolution was duly confirmed as a special resolution: That it has been proved to the satisfaction of this meeting that the company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same, and accordingly that the company be wound up voluntarily; and that G. W. Spencer be appointed liquidator for the purpose of such winding-up.

RALMINA SOAP CO., LTD. (C.W.U.V., 12/1/29.) At an extraordinary general meeting of the members of the said company, duly convened, and held at 14, Salmen Street, South Grove, Bow, E.3, on December 31, the following extraordinary resolution was duly passed: That it has been proved to the satisfaction of the meeting that the company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same, and accordingly that the company be wound up voluntarily; and that M. G. Hacker, Hacker Rubens and Co., 23, Surrey Street, Strand, W.C.2, be and he is hereby appointed liquidator for the purposes of such winding-up.

Application for Discharge

WHITE, Felix Lane, Empire House, St. Martins-le-Grand, London, E.C., manufacturing chemist. (A.F.D., 12/1/29.) Hearing, January 29, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

New Companies Registered

THOMAS ANDERSON, LTD.—Registered as a "private" company on January 7. Nom. capital £100 in £1 shares. To acquire the goodwill, patents, licences, trade marks, and brands of the business of Thomas Anderson, Ltd. (incorporated in 1905), with or without any of the other assets, to carry on that business and any other business for the time being acquired or carried on by this company for the benefit and under the control of Turner and Newall, Ltd. or their successors, and that of insulating engineers, etc.; manufacturers of and dealers in cork, magnesia, asbestos, silicate of cotton, lime refuse, fossil-meal, charcoal, flax, jute, etc. A subscriber: S. Turner, Spring Bank, Bamford, Rochdale. Turner and Newall, Ltd., are the permanent managers.

COMPLEX RESEARCH CO., LTD.—Registered January 3. Nom. capital £100 in £1 shares. To acquire a secret process or formula for the scientific manufacture of gold from chemical and other compounds or matter, and to carry on the business of gold and silversmiths, jewellers, gem merchants, watch and clock makers, etc. A subscriber: E. Fitzpatrick, 430, Camden Road, London, N.7.

EXCELL THOMAS, LTD., Tram Terminus, Port Tenant Road, Port Tenant, Swansea.—Registered January 3. Nom. capital £500 in £1 shares. Manufacturers of and dealers in chemicals and chemical substances, and the products and by-products thereof, etc. Directors: Mrs. Florence H. M. Thomas, Mrs. Mary Lloyd.

HACKFORD-ALEXANDER MINERAL FURNACES, LTD., 12, Broadway, Westminster, London, S.W.1.—Registered on December 31 as a private company. Nom. capital £65,000 in 60,000 8 per cent. cumulative preference shares of £1 each and 100,000 ordinary shares of 1s. each. To use, exercise, develop, or turn to account any process or processes for the carbonisation and reconstruction of coal or other fuels or bituminous substances, and the heat treatment of minerals, etc. Directors: H. Alexander, J. A. Greene.

LEYLAND AND THOMAS, LTD., Hornspit Lane, West Derby, Liverpool.—Registered January 2. Nom. capital £500 in £1 shares. Chemists, druggists, drysalters, oil and colourmen, etc. Directors: H. Green, G. E. Leyland, F. W. Smith, H. C. Thomas.

NORMAN LEE (LONDON), LTD., 133, Moorgate, London, E.C.2.—Registered January 2. Nom. capital £5,000 in £1 shares. To acquire the business of a manufacturing chemist, etc., carried on by N. Lee, at 133, Moorgate, London, E.C.2. A director: N. Lee, 32, Midhurst Avenue, Muswell Hill, London, N.10.

SYNOT, LTD.—Registered January 5. Nom. capital £2,500 in 2,000 7 per cent. preference shares of £1 each and 10,000 deferred shares of 1s. each. To acquire the business of manufacturers and vendors of a preparation called "Synot" lately carried on by John Scott and Co. (London), Ltd., at 49, Old Bond Street, and 40, Gerrard Street, W., including the trade mark "Synot," No. 471,484, Class 3, and to carry on the business of manufacturing and retail chemists, manufacturers of and dealers in chemicals and chemical preparations, and toilet preparations, photographers, etc. Directors: Elise Battye, Fernhill Cottage, Windsor Forest, and J. H. Nelson.

THE UNION PETROL CO., LTD., Whitechapel Lane, Cleckheaton.—Registered as a "private" company on January 5. Nom. capital £60,000 in £1 shares. To acquire and amalgamate and carry on the undertakings or any part thereof of producers, storers, dealers and distributors of petrol, benzole and other oils and spirits, carried on by Henry Ellison, Ltd., and Ellison and Mitchell, Ltd. respectively, and to adopt agreements with the said companies and their respective liquidators. Directors: H. Ellison, G. W. Mitchell, H. E. Sugden, H. S. Ellison.

Calendars Received

CALENDARS have been received from the following:—

The publishers of *The Paper Makers' Monthly Journal*, who send a monthly calendar.

The British Oxygen Co., Ltd., who send a weekly combined diary and calendar.

The Clayton Aniline Co., Ltd., who send a very decorative coloured monthly calendar, incorporating a coloured reproduction of V. Marais Milton's picture, "A Good Story."